THE PHILIPPINE
JOURNAL OF SCIENCE
D. GENERAL BIOLOGY, ETHNOLOGY AND ANTHROPOLOGY

VOL. VII AUGUST, 1912 No. 4

THE STONE INDUSTRY AT SAN ESTEBAN, ILOKOS SUR.

By EMERSON BREWER CHRISTIE.
(From the Division of Ethnology, Bureau of Science, Manila, P. I.)

At San Esteban, Ilokos Sur, an industry exists which, because of its possibilities, is not without interest. I refer to the business of working stone found in that municipality.

I have been unable to find any records referring to the beginnings of the industry. It seems certain, from statements made to me by the oldest workers, that it was in existence sixty years ago. Available statistics of the industry go back to 1906. In that year a licensing and taxing system was put in force which compelled the keeping by the municipal treasurer of books in which is entered the amount of tax paid on stone articles manufactured, levied at the rate of 10 per cent of the local value. The record applies only to the products of the quarries which are situated on government land. No record is kept of the sales of filters, the stone for which is brought up from the bottom of the Bay of San Esteban. Moreover, for the period from January 4, 1908, to April 10, 1910, inclusive, no entries referring to stone appear on the books of the municipal treasurer, for the reason, according to the statements of the municipal officials, that during that period no attempt was made to collect the tax on stone products. Thus figures on the industry are available only for the following periods: July, 1906, to January 3, 1908, and from

April 11, 1910, to November, 1911, inclusive. At the present writing (December, 1911), figures for December, 1911, have not yet been entered.

The books of the municipal treasurer show that from July, 1906, to the end of that year no stone products were sold. In 1907, 325 pesos [1] worth was sold. For 1908, there is only one entry, that for January 3, which shows that on that date the tax was collected on sales amounting to 105 pesos. In 1910, the tax was paid on sales aggregating 1,230.90 pesos. In the first eleven months of 1911 the sales amounted to 416.40 pesos. Work has been somewhat vigorously carried on during the present month (December, 1911), and the books may show at the end of the year sales amounting to two or three hundred pesos during this month.

Incomplete as they are, the preceding figures suffice to show that the San Esteban stone industry is at present of slight commercial importance. It is claimed by the workers that before the insurrection it was in a greater state of prosperity owing to a much better demand for San Esteban paving stones. Whether that statement be true or not, it is certain that the present amount of business is a small fraction of that which the supply of stone at San Esteban renders possible.

Before proceeding to a description of the various stone articles made at San Esteban, it may be useful to say a few words concerning the men who do the work.

THE STONECUTTERS.

As far as I know, there are but four men at San Esteban who make filters. These men are primarily fishermen, and make filters only as a by-occupation. Their total output for a year is not more than one or two dozen. The filters are made one or two at a time, in the yard or house of one of the men, where they lie until someone buys them. Sometimes they are made to order.

On the other hand, the men who work the quarries are numerous. But most of the stonecutters do only a few pesos worth of stone work in a year. They do not think it worth while for each man to take out a license from the Bureau of Forestry, and another one, for which the charge is 2 pesos, from the Bureau of Internal Revenue. Therefore, by common consent, only one of their number takes out the licenses, and all

[1] One peso Philippine currency is equal to 50 cents United States currency.

dealings with the treasury are carried on through him. This man keeps a list of the men who wish to cut stone during his holding of the license. He also has a written agreement with many of the workers to the effect that they will report to him the case of any man they catch trying to defraud the Government of the amount of the tax on sales. Whenever an article made by any of the men is sold, the fact must be made known to the licensee, who keeps an account of sales and settles with the municipal treasurer at convenient intervals.

At the present writing there are on the licensee's list of stone workers 62 names. Examination of the municipal treasurer's books showed that 36, or over one-half, of these men own agricultural land in San Esteban. All but 10 of the remainder are said to own land also, either in some other town, or in conjunction with some relative in whose name the land is recorded. Ten of the workers own land appraised at 200 pesos or over in San Esteban. The majority of the landowners among the stonecutters own but a small piece, which is insufficient for their needs. Out of the 62 stone workers, 8 are in the habit of going to Pangasinan annually for the rice harvest, spending two or three months on the trip. One is in the habit of going to Kagayan for the same purpose. Both the landless men and those who own but a small piece are accustomed to work a part of the time for local farmers for wages or on shares.

Moreover, almost without exception, the stone workers are fishermen. Some wade about near shore with small nets. Others go out on small rafts from which they catch fish, usually with hook and line, but sometimes also with nets. Nets and rafts are made by themselves. The quarry-workers do not as a rule sell fish. They only fish enough to supply their own families.

It is obvious from these statements that none of the stone workers is a specialist. They divide their time between at least three means of livelihood; fishing, stone-working, and farming; the last is their habitual and most important employment. Stone-working is a mere by-occupation for slack times with almost all. Two or three men like it and have attained more skill than the others. The great majority prefer to farm when they can.

THE DISTRIBUTION OF THE PRODUCT.

The distribution of the product is effected with the same slackness as the production. It may almost be said that the workers pay no attention to it. There is at San Esteban no

public market, nor is there any other place where a stock of stone articles is kept for sale. I know of only one person in the town who might be called a broker or middleman in disposing of stone articles. This is a decrepit old woman, widow of a stone worker, who is reported to have done at one time a considerable trade in paving stones from San Esteban. Her business is said to have greatly fallen off because of the slackness of the demand for these articles. She is said in times past to have sent sailing vessels loaded with them to Vigan and Manila.

Occasionally a buyer comes to San Esteban with the intention of purchasing stone articles to the value of 50 or 100 pesos, but in such cases he usually has to wait in the town for two or three weeks until the workers have made the required amount. No one keeps a large stock on hand. During the past four months two men have come to the town to buy stone articles wholesale. One was a man from Narvakan, Ilokos Sur, who is reported to buy 50 pesos worth of mortars annually. This year it is said that he intends to take them by boat to Zambales Province. The other was a man from Pangasinan, whose usual business is said to be horse-dealing. I was told that he purchased between 100 and 150 pesos worth of mortars. Each of these men had to wait two or three weeks for the order to be filled. Sometimes a San Esteban man who is going to Pangasinan to work in the rice-fields takes one or two rice-mortars with him for sale, and there have been cases of corn-mills being taken by San Esteban men to Kagayan. If hearsay is to be believed, small sailing vessels are sometimes sent down the coast with cargoes of stone, but as far as I know, aside from the old woman mentioned above, no one makes a business of disposing of the stone products of San Esteban.

Stonecutters at San Esteban are not in the habit of working for wages. When a man's other work is slack, he makes an article or two, the stone for which is brought to his house, where he can work at it intermittently. On completion, the articles are left lying around the yard until a purchaser comes along. When a wholesale buyer, that is, a man who wishes to spend from 50 to 100 pesos, comes to the town, he passes the word around that he wants to buy such and such articles, and those are made and brought to him by the workers until he has enough. He often advances part of the price to men who state that they will bring him their work. Sometimes he gives a present of a peso or two to the most influential man among the stone workers for the sake of his influence with the others.

TOOLS USED BY THE WORKERS.

The filter-makers use the following tools in their work:

Chisels. Usually purchased from quarry workers.

Crowbar. Not much used, a bar of wood being often used. Purchased.

Hatchet or *ax.* Purchased.

Bolo. Made by Iloko smiths of Santa, Ilokos Sur. Either purchased direct or from peddlers.

The quarry workers do their work with the following tools:

Chisels. These are of various sizes and shapes, some ending in a point, others in a cutting edge. The steel for these implements is bought in bars by the workers. These are then cut to the required lengths, and tempered by some of the men themselves. Two or three smithies for making and sharpening tools exist in San Esteban under the houses of stone workers. The equipment consists of a bellows, made of two hollow cylinders of wood fitted with pistons headed with cock's feathers, a hollow scooped out in the ground for a charcoal fire, one or two pairs of pincers, a stone trough for water, and a rude anvil.

Wedges. These are obtained in the same manner as the chisels.

Hammers. A stone worker usually has two of these, a large one used as a sledge-hammer and a small one used to drive the chisels. Both kinds are usually purchased from Iloko smiths of Santa, Ilokos Sur, although several of the stone workers claim to be able to make them for themselves.

Hatchet. Secured by purchase.

Crowbar. Either bought ready-made or fashioned from a bar by the stone workers.

No explosives are used by the stone workers.

SITUATION OF QUARRIES.

The situation of the quarries with reference to the harbor of San Esteban and the main north-and-south highway is of importance in estimating the possibilities of this stone industry. Stone for various purposes may be obtained in numerous localities within the boundaries of the municipality, but the only quarries in use at present are the following:

Mabuyag.—This is the most conveniently located quarry, and is probably the most used. It lies on the western face of a hill about 35 kilometers south of Vigan, and about 2 kilometers north of the *presidencia* of San Esteban. It lies almost immediately on the main north-and-south highway which passes

through San Esteban, on its eastern side. The harbor of San Esteban is about 2 kilometers from the place, and a good hard road passes within a short distance of the beach. Mabuyag furnishes stone suitable for all the staple products of San Esteban, namely rice mortars, paving stones, and hand-mills for rice and corn. Stones suitable for ordinary paving blocks, of about 25 by 18 by 5 centimeters, lie about on the surface in considerable abundance, requiring but little labor to dress into commercial form. Stone for mills and mortars, as well as that intended for large paving stones, has to be cut out of the solid rock. This is exposed vertically along a considerable distance, in strata of marked dip and various thicknesses.

Kappakappa.—This is the name of a *barrio* and adjacent locality situated 2.2 kilometers to the eastward of the *presidencia* of San Esteban. Following the present paths and road, it is about 3 kilometers from the harbor beach—perhaps a little more. It suffers from the disadvantage that to reach it from the coast one must follow a steep path through hilly country practically all the way. The men who get stone here carry it down to San Esteban on their shoulders or on carabao sleds. It is, nevertheless, used a good deal as a source of stone, especially of that intended for rice-mortars and hand-mills. The reason seems to be that the stone for this purpose is not only very abundant, but somewhat easier to get out than at Mabuyag, owing apparently to the existence of large detached pieces of rock at or just below the surface. It is claimed, moreover, that the stone here is a little finer-grained than that at Mabuyag. The quarries of Kappakappa lie along the eastern base of a ridge running approximately north and south. Almost anywhere along this base, for a distance of about 2 kilometers northward from the village, serviceable stone can be secured. At the present time 3 quarries are in actual use, but there are some half a dozen former workings which could probably be reopened, if necessary. One of the workings in use is in the village of Kappakappa, and the other two are a little to the north of it. Around each place where stone has been taken out is a substantial pile of rejects which could be changed, with a little dressing, into medium-sized paving stones, if desired.

While Kappakappa and Mabuyag are the only localities exploited to any appreciable extent at present, there are two other localities in the municipality which deserve mention. One is Apatot. This is a *barrio* on the seashore about 2 kilometers

southwest of the *presidencia* of San Esteban, and about the same distance from the harbor. On the low hill just eastward of the village is found an abundance of loose blocks of limestone lying about on the surface. This stone is of light color, and so soft that it is very easy to work. It is used to a slight extent for making small mortars for crushing spices and for breaking up betel-nut for the use of the aged. Communication between Apatot *barrio* and the harbor of San Esteban is by boat, by foot-path, and along the beach.

Ansad, the other place which deserves mention, is a *barrio* and locality about 2.4 kilometers to the southeast of the *presidencia* of San Esteban, and slightly farther from the harbor. At present no stone is being obtained there, but along the eastern slope of a ridge running approximately north and south just west of the village there exists an abundance of loose flat stones large enough to make paving stones of medium size with little labor of dressing. It is said by the people of San Esteban that some years ago, when there was a brisk demand for paving stones, a great many were obtained here. The appearance of part of the hillside, showing former workings, tends to corroborate this statement. The only communication between Ansad and San Esteban is by footpath the greater part of the way, but a trail passable for carabao sleds could easily be put through, if necessary.

ARTICLES MANUFACTURED.

Data on the proportion of different articles made are available only for the period from April 11, 1910, to the end of November, 1911. The values of articles sold during this period are shown in Table I.

TABLE I.—*Values of stone products of San Esteban.*

Year.	Article.	Value.	Total.
		Pesos.	*Pesos.*
1910	Paving stones	555.00	
1911[a]	do	174.00	729.00
1910	Mortars	670.50	
1911[a]	do	240.00	910.50
1910	Handmills	5.40	
1911[a]	do	2.40	7.80

[a] Eleven months.

Regarding the value of stone filters, no statistics exist.

It appears from the foregoing that the most important branch of the quarry work at San Esteban is at present the making of rice mortars; the second in importance, that of making paving stones. Probably the value of the stone filters made, owing to the comparatively high price of these articles, has been greater during the past two years than that of the handmills. I propose to give a brief description of these four classes of articles as made at San Esteban, and of the procedure in making them.

FILTERS.

It is reported that formerly material for these articles could be found on the beach, but at present the makers get it from the bottom of the Bay of San Esteban. It is said that it is obtained sometimes at a depth of 6 or 7 meters. According to my own observation, added to the best reports I could get, it is not necessary usually to go deeper than 3 or 4 meters. The procedure is as follows:

A party of men set out from shore, each on board of one of the small rafts (*rakit*) used by fishermen. The bottom is observed until a lump of stone suitable for the purpose is seen. Then one or two of the men dive with a stout bar to loosen the stone from the bottom. When the stone has been pried loose, one of the men dives with a rope which is passed around it. The free end of the rope is then fastened to a stout pole laid crosswise on two or three small rafts. A bar fastened to this pole enables the men to give the pole a few turns, winding in the rope and jerking the stone off the bottom whenever an obstacle is encountered. No attempt is made to land the stone on the rafts. By means of paddles and poles the rafts—now fastened together—are propelled to the shore, dragging the stone along the bottom. When shallow water is reached, the men get off the rafts and roll the stone up the beach where it is roughhewn with an ax. After this it is rolled up into the yard or under the house of one of the workers. With ax and *bolo* the stone, which is very soft for some time after being taken from the water, is further shaped and smoothed. The maker now scratches two circles on the stone, one marking the outer and the other the inner circumference of the filter's rim. The chisel and hammer are now brought into play to hollow out the stone. The *bolo* is also freely used to shape, smoothe, and hollow the article until it is finished. To use the filter, it is only

necessary to place it above a receptacle for water, to pour water into the filter, and allow it to find its way through the stone and drip below. The first two or three filterfuls are said to be salty. I do not know how effective this kind of filter is.

PAVING STONES.

Stone suitable for making paving stones of moderate size, that is, 25 centimeters square and under, can be picked up loose on the surface in abundance at several localities within the municipality. The first work is done on the spot or under the shade of a neighboring tree. For the finishing touches the slabs are often carried home. If the blocks are too thick, they are split by making a row of holes with chisel and hammer. Each slab is then shaped roughly by chipping off pieces with blows of a hammer. The stone is then further chipped with a chisel until it assumes commercial shape. No attempt is made to make the stone completely smooth, nor are the stones made of uniform size. Those in one lot may vary several centimeters in one dimension or another.

If the paving stones desired are large ones, for example, 100 by 50 centimeters, they must be split out of the solid rock. This is done by making holes with a chisel and driving steel wedges into them with a sledge-hammer. When the desired piece has been split out, it is pried up with a crowbar and lifted out by hand. The block is shaped roughly with a hammer and then removed to a shady place for finishing. The worker sits on the ground by the stone and chips with hammer and chisel, sometimes also with a hatchet, until the work is done. Exact uniformity in size is not attempted, so that in a lot of a dozen or so one will find variations in size of several centimeters.

Two men work together in splitting out the stone for large paving stones. The finishing is done by one.

RICE MORTARS.

The stone workers state that this is a newer article of trade than paving stones. If they may be believed, the selling of mortars by San Esteban people to other towns practically commenced within the last dozen years. It is certain that stone mortars from San Esteban are at present the usual implements for husking rice in the Iloko towns I have seen from Vigan to Kandon, and according to general report they are common in many other towns, not only in Ilokos Sur, but in Union and

Pangasinan. During the last few weeks a lot of about 50 is said to have been bought for transportation by sea to the Province of Zambales.

These husking mortars have the obvious advantage over wooden ones of greater durability. Moreover, nearly every user of them who had also used wooden mortars, and from whom I have made inquiries, declared that the work was more quickly accomplished with the San Esteban mortars. Some users went so far as to say that one-half the time was thus saved. This is probably an exaggerated way of expressing a real saving of time. Rice husking forms so large a part of the daily routine of a multitude of Filipino households that a mortar that will save time in this operation is of real importance to the community. The husking is done in stone mortars in the same way as in the wooden ones, by pounding with a heavy wooden pestle.

San Esteban rice mortars differ considerably in size and somewhat in style. They are roughly grouped by the makers into three classes, those weighing about 90 kilograms and under, those weighing about 115 kilograms, and those weighing 135 kilograms and over. Mortars weighing about 90 kilograms are the most popular; those weighing 110 to 115 are not uncommon; the largest ones are not extensively used. A mortar which I measured, which was typical except that it was larger than most, weighed 137 kilograms, and was of the following dimensions:

Dimension.	Cm.
Diameter at top, outside measurement,	53
Diameter at top, inside measurement,	45
Diameter at base	38
Height	53
Depth	25

The main difference of style in mortars is that in some the opening contracts gradually without a break to the bottom, while in others, the opening, after contracting uniformly to a point about halfway to the bottom, abruptly ceases to contract for several centimeters, until the bottom is almost reached. The lower half of the opening, therefore, forms a sort of pocket or deep bowl, with sides perpendicular for some distance. Quite a number of San Esteban mortars which I have seen in use were of the former type, while of nearly 70 new mortars, every one was of the latter style. The kind of mortar, therefore, in

which there is an abrupt break in the contraction at a point about halfway to the bottom may be said to be the prevailing style at present.

The first step in making a rice mortar is splitting out the block of stone for it. This is accomplished by making holes with chisels and driving in wedges with a sledge-hammer. The block is then roughly trimmed with a hammer. The worker then scratches two concentric circles on the stone to mark the inner and outer circumferences of the rim of the mortar. Thereafter he hollows the stone with hammer and chisel to the desired depth. Finally his hatchet is brought into use to give the finishing touches which require several hours. Protuberances are chipped off the sides; the upper part of the hollow of the mortar is also treated. When the article is finished, one notes the fine channels and ridges left by the hatchet around the rim and in the mortar as far as about halfway to the bottom. This hatchet work is often done at home, the maker sitting on the ground under his house or in a shady corner of his yard to do the work.

Besides the rice mortars, all of which are heavy, a few small mortars are occasionally made at San Esteban for pounding spices or crushing betel-nut for the aged. Sometimes these small mortars are made from the same stone as the rice mortars and sometimes from the lighter colored and very soft limestone found in the *barrio* of Apatot. In the latter case they are given a final smoothing by rubbing on a hard stone on which water is poured from time to time. These small mortars of Apatot limestone differ conspicuously from the bulk of San Esteban stone artifacts by their neatness and finish. The pestles are of stone.

CORN MILLS.

These are of two main varieties. Those of the common kind weigh, on the average, about 25 kilograms, though lighter ones are not unusual. A corn mill of this sort is made up of two stones, usually of about equal size and similar shape. The dimensions are commonly, for each stone, about 32 centimeters in diameter and 9 centimeters in thickness. The two stones are held together with a stick or peg which fits into a hole made at the center of each stone. The corn is fed through a hole in the upper stone. The upper stone is turned on the lower one by means of a stick which fits into the former near its edge.

The other style of corn mill is called at San Esteban the "Kagayan mill" because it is said to be an article of export to that province. It is not used to any appreciable extent by the San Esteban people and I have seen but one specimen, which may or may not have been typical. These mills are said to weigh usually about 50 kilograms. The one I saw was somewhat lighter. The upper and nether stones were of the same diameter, but the lower stone was 2 centimeters thinner than the upper. The upper stone had a sunken space on the surface into which the corn was poured and then worked through a hole onto the lower stone. The mill, beside being of greater size than those in common local use, differed in that the stick with which the upper stone was turned on the lower was thrust, not into the upper surface of the upper stone, but into a hole in its side, about half way between its upper and lower edges.

The reason for the difference in size between the corn mills made for local use and those intended for the Kagayan trade is said by the San Esteban people to be that the Kagayan people eat much corn and so want it ground fine, while the San Esteban people usually intend the corn they grind for fattening pigs.

RICE MILLS.

These articles, as made at San Esteban, vary in size and are roughly classified accordingly by the stone workers into "first" and "second" class. Most of the local product belongs to the latter. One which seemed fairly typical to me had the following dimensions:

Dimension.	Cm.
Diameter of upper stone	25
Thickness of upper stone	12
Diameter of nether stone	41
Thickness of nether stone	8
Length of spout (on nether stone)	10.5

It will be noted at once that the rice mill differs in appearance from the corn mills. The lower stone is much larger in circumference than the upper. The nether stone also has a deep groove or channel running around the lower edge of the upper stone, to receive the ground rice. This channel ends in a projecting piece which may be called a spout, through which the ground rice is removed. The upper stone is turned by means of a short bar thrust in a hole on its side and situated about halfway between the upper and lower edges of the stone. Rice mills are much used for grinding rice to be used as starch.

PROCESS OF MAKING MILLS.

Material for making small corn mills may often be picked up loose on the surface in San Esteban. That for the larger mills, whether for corn or rice, usually has to be split out of the rock. After the desired piece has been taken out by means of chisel holes, wedges, and prying with a crowbar, it is roughly shaped with a hammer. Then the maker, with the help of a chisel and a piece of string, scratches one or two circles to serve for his guidance in further shaping of the stone. He then proceeds with hammer and chisel to chip the stone to the shape desired. The finishing touches are usually given with a hatchet. By this means he not only gives a certain rough finish to the exterior of the mill, but makes small converging ridges on the inferior surface of the upper stone and the superior face of the nether one. This is believed by the makers to add to the efficiency of the mills.

OTHER ARTICLES.

Beside mortars, paving stones, and mills, which are the staple objects of the stone manufacture at San Esteban, the following articles are made:

Metates for crushing cacao. These are of various sizes. The few specimens which I have seen at San Esteban were made of single slabs of stone. The stone is chipped away in such a manner that the slab, as it lies on the floor, offers a sloping surface on which the cacao beans are crushed with a stone roller.

Threshing floors are also made of San Esteban stone. A few large slabs are set flat into the ground, forming a floor, while other slabs are set up on edge around its sides as a wall to prevent the grain from scattering. The rice in the ear, which comes from the field in large bunches, called *manojos*, tied with a bit of bark, bamboo, or other fastening, is laid on the floor and held down by the foot of the operator pressing on the straw, while he or she beats out the grain with the long heavy pestle used in husking rice. Threshing floors of San Esteban stone abound not only in that pueblo but in neighboring ones.

Feeding and watering troughs. These articles of San Esteban stone are very common there and in neighboring towns. They are of various shapes—square, oblong, oval, and round—and range in size from those holding a dozen liters or more to those holding a cupful and intended for poultry. Occasionally one is made with two compartments, one for food and one for water.

A San Esteban product which deserves mention, although it is no longer manufactured, is the stone cloth-polisher. The use of cotton cloth with a shiny finish for men's trousers went out of fashion among the Iloko people some years ago and the demand for stone cloth-polishers went with it, but while the fashion lasted, a number of these articles were made at San Esteban and exported to Narvakan, Vigan, San Vicente, and in all probability, to other towns. The Iloko word for the implement is *lid-lid-an*. It consists of a heavy stone, frequently not far from 200 kilograms in weight, whose shape can best be understood from the illustration (Plate V). The cloth to be treated is moistened and then wound on a roller. This roller is placed on a heavy board with a concave surface. The stone, the under side of which presents a flat rectangular surface, is then placed transversally on the roller. The operator steps upon the stone and by shifting his weight from one foot to the other gives a "seesaw" motion to the stone. The stone is also given a movement which takes it from one end of the roller to the other, and thus comes in contact with the whole width of the cloth. The illustration does not represent an actual operation. The man is posed to show the position taken by users of the *lid-lid-an*. In actual practise, the heavy concave board is partially sunk in the ground to keep it steady, and a hand-rail is set up on the right and left of the operator, on which he uses his hands to assist him in keeping his balance.

I have seen only one *lid-lid-an* in use. This was at Narvakan, Ilokos Sur. I have seen disused and neglected stone cloth polishers in San Vicente, Vigan, and San Esteban.

There is some reason to believe that the idea of the *lid-lid-an*, and perhaps even the first models, came to the Iloko country from China.[1]

PRICES OF MANUFACTURED ARTICLES.

In considering the possibilities of the San Esteban stone industry, the price at which the various articles have actually been sold there in 1910 and 1911 is worthy of attention.

Paving stones.—During the period from April 11, 1910, to the end of the year, these articles were sold at San Esteban

[1] Since this article was written I have seen in the number of the *National Geographic Magazine* for December, 1911, a reproduction of a photograph taken in the Province of Szechuan, China, which shows a stone cloth-polisher in use. This implement is identical in shape and manner of use with the *lid-lid-an*.

to the number of 9,250, of an average weight of a little more than 4 kilograms each. The price was 6 pesos per hundred stones. In the first eleven months of 1911, 2,900 paving stones were sold, of an average weight of a little more than 7 kilograms apiece. The price was the same. As will be noted, the difference of a few kilograms in the weight of paving stones makes no difference in the price. Stones suitable for paving blocks 25 centimeters square and under can be picked up on or near the surface in abundance in San Esteban. But when the paving stones required are of such a size as to require their being split out of the solid rock, the price rises with a jump. For example, paving stones about 100 by 50 centimeters in size are said to sell for 80 pesos to 100 pesos per hundred.

It should be stated that it is customary at San Esteban for the maker to transport articles intended for shipment to the beach without extra charge.

Mortars.—During the period April 11, 1910, to the end of the year, 447 rice mortars were sold, of an average weight of nearly 93 kilograms each. The average price was 1.50 pesos. During the first eleven months of 1911, the number sold was 160, the average weight nearly 91 kilograms, and the average price 1.50 pesos. This is what one usually has to pay at San Esteban for 90-kilogram mortars, although I have heard reports of a trader having obtained them cheaper. Those 25 kilograms heavier cost 2 pesos or 2.50 pesos apiece, while those of the heaviest class sell for 3 pesos.

Mills.—In 1910, 18 mills, and in 1911, 8 mills, appear on the books of the municipal treasurer as having been sold, at an average price of 30 centavos apiece. The weight and kind are not specified. These articles were probably rather light corn-mills of the sort in common local use. I know of no other records of sales of San Esteban mills. According to the most reliable information I could secure, one can not depend on buying corn mills of the local type at less than 50 centavos; the heavy corn mill called the "Kagayan mill" is worth locally from 1 peso to 1.50 pesos, and an ordinary rice mill, weighing in the neighborhood of 35 kilograms, 1.50 pesos.

Filters cost from 4 pesos to 9 pesos according to size.

SUMMARY.

The raw material, with the exception of that used for filters, is found on Government land; it appears to be abundant. Men

who understand in a rude way the working of the local stone are present in fairly respectable numbers, but do not give more than a small fraction of their time to stone working. The San Esteban paving stone probably has been more in demand formerly than at present. Whether the demand will revive is a matter of conjecture.[2] The stone rice-mortars seem to have a widespread field of possible use in the Archipelago. The greatest impediments at present to the growth of the industry would seem to be the lack of facilities for distribution, such as some responsible person or firm through whom merchants at a distance could order articles, and the absence of any considerable stock of ready-made articles which could be drawn upon at any time.

[2] San Esteban stone of the kind used for mills, paving stones, and rice mortars is an impure limestone of a hardness of about 3.5. It is, therefore, too soft for use as paving material in places subject to heavy traffic.

ILLUSTRATIONS.

(Plate I from photographs by Christie; Plates II, III, IV, and V from photographs by Cortes.)

PLATE I.

FIG. 1. Application of finishing touches to rice mortar with hatchet.
2. Coral rock for making filter, being rolled toward the beach.

PLATE II.

FIG. 1. Inner surfaces of corn-mill, showing grooves. Diameter about one-eighth actual size.
2. Corn-mill, normal position. Diameter about one-seventh actual size.
3. Rice mortar. Diameter about one-tenth actual size.
4. Rice-mill, upper stone placed on edge, showing bowl for receiving rice and hole for its passage to the space between the stones. Diameter about one-tenth actual size.

PLATE III.

FIG. 1. Paving stone. Width about one-tenth actual size.
2. Filter. Width about one-tenth actual size.
3. Tobacco-beater. About one-fifth actual size.
4. Double-basined trough. About one-fourth actual size.

PLATE IV.

FIG. 1. *Metate*. Roller about one-seventh actual length.
2. *Metate*, under surface. Width about one-ninth actual size.
3. Candlestick, unfinished. About one-sixth actual size.
4. Candlesticks, finished. About one-sixth actual size.

PLATE V.

Positions taken in using the *lid-lid-an* or stone polisher. In actual use there would be a hand rest on each side of the standing figure.

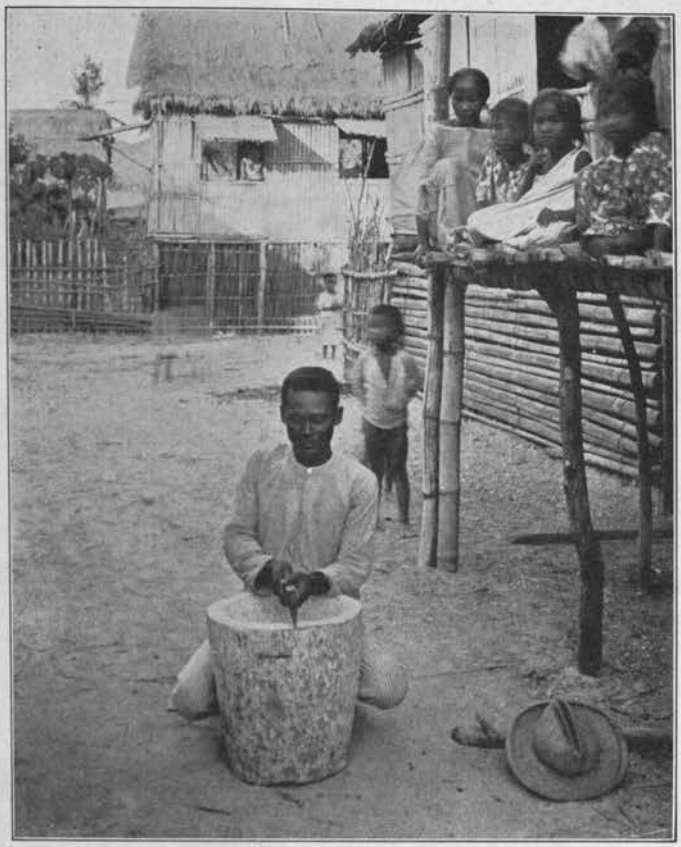


Fig. 1. Finishing a rice mortar.

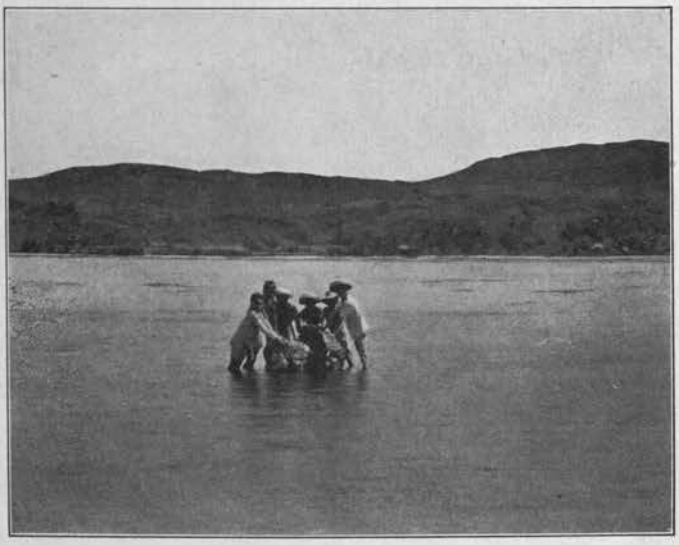


Fig. 2. Men rolling a piece of coral rock.

PLATE I.

Fig. 1. Corn mill.

Fig. 2. Corn mill.

Fig. 3. Rice mortar.

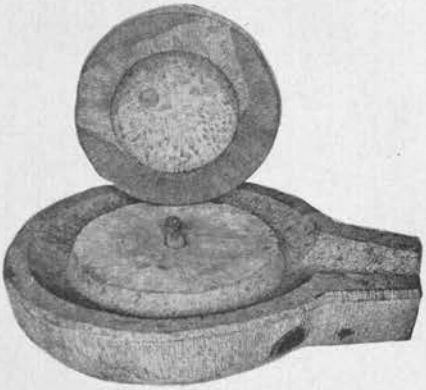


Fig. 4. Rice-mill.

PLATE II.

Fig. 1. Paving stone.

Fig. 2. Filter.

Fig. 3. Tobacco-beater.

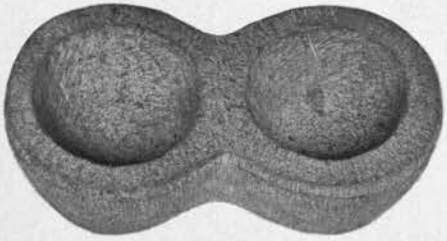


Fig. 4. Double-basined trough.

PLATE III.

Fig. 1. Metate.

Fig. 2. Metate, under surface.

Fig. 3. Candle-stick, unfinished.

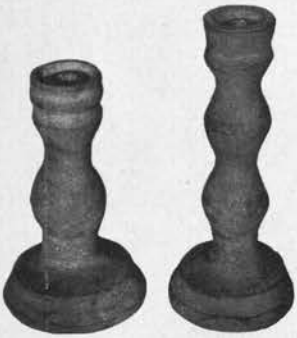


Fig. 4. Candle-sticks, finished.

PLATE IV.

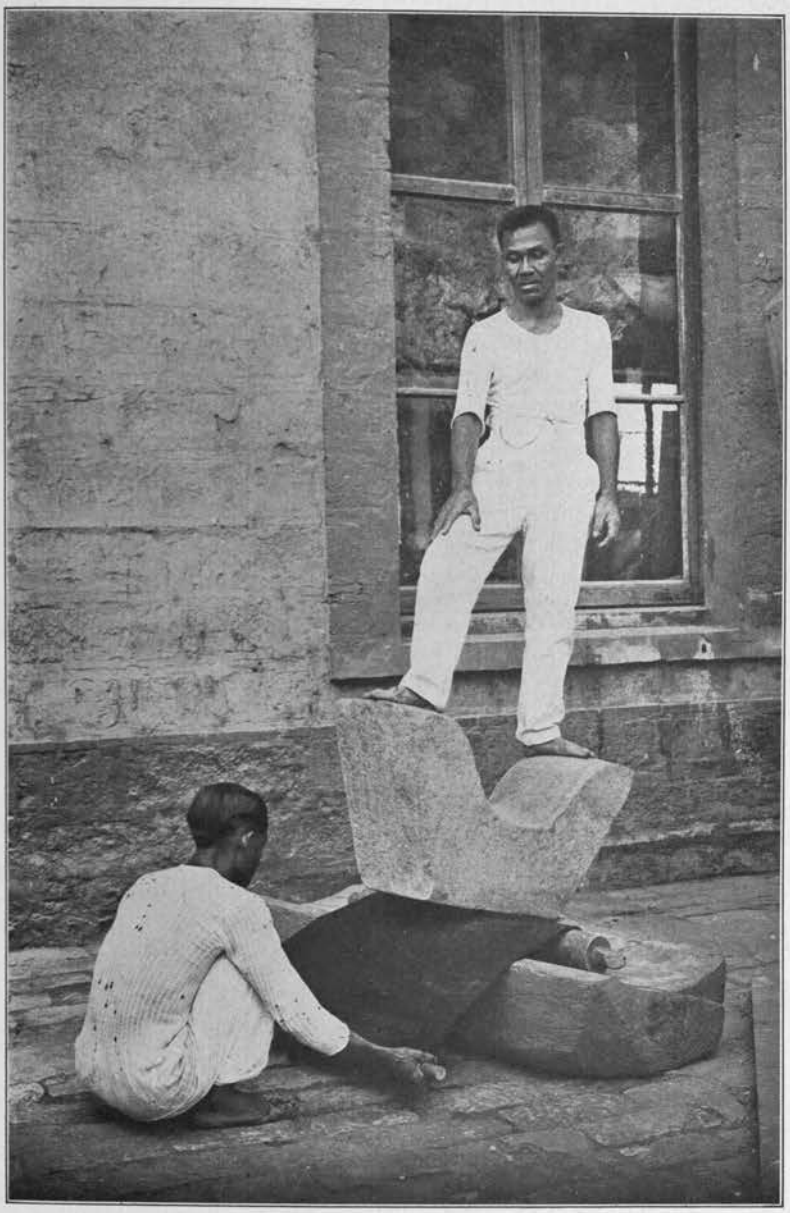


PLATE V. POSITIONS TAKEN IN USING THE STONE-POLISHER.

THE PHILIPPINE JOURNAL OF SCIENCE,
D. General Biology, Ethnology and Anthropology.
Vol. VII, No. 4, 1912.

NOTES ON THE WOOD-WORKING INDUSTRY OF SAN VICENTE, ILOKOS SUR.

BY EMERSON BREWER CHRISTIE.
(*From the Division of Ethnology, Bureau of Science, Manila, P. I.*)

The town of San Vicente, Ilokos Sur, had, according to the census of 1903, about 6,000 inhabitants. Its lands are restricted in amount and poor in quality. Well-informed persons say that it is obliged to import the greater part of its rice supply from other towns. A good many of the people of the town are said to have emigrated; the rest are able to gain a livelihood only because of the existence of three industries; namely, weaving, salt making, and woodworking. I propose in these notes to deal with the last-named industry.

Woodworking at San Vicente is sufficiently advanced to have split up into the following specialties: carpenter work, the making of carved boxes, the manufacture of combs, the making of images, and furniture making.

CARPENTERING.

The carpenters who follow their trade as their exclusive means of livelihood number about 30 adult men. The minimum wage of a carpenter is 50 centavos [1] a day; skilful men are able to command 75 centavos and master carpenters (*maestros*) earn from 1 peso to 1.50 pesos per day. San Vicente itself offers practically no field to these men. Like a large proportion of the towns of Ilokos Sur it presents the external appearance of a stagnant or even decaying town; no building operations worth mentioning are going on. The carpenters, therefore, go to other towns to find work; frequently they are sent for. Vigan is within a very few kilometers, also Bantai, Santa Catalina, and Kawayan. Vigan is the largest of these towns and is the pro-

[1] One peso (100 centavos) Philippine currency equals 50 cents United States currency.

vincial capital. But San Vicente carpenters also go farther afield. They are in the habit of going to many towns within the province and even outside in prosecution of their work.

There is nothing peculiar or noteworthy regarding San Vicente carpenters. The tools they use and the skill they exhibit are probably about the same as those of carpenters elsewhere in the Philippine provinces. An intelligent Filipino priest who has employed them on a church and *convento* states that he has found them timid about undertaking any large work, but teachable.

San Vicente carpenters have no union, but nevertheless make a very fair living. Master carpenters receive about twice as much pay as a municipal teacher or the president of their town, and, unlike the teachers, they can earn money all the year around. It is a current saying in San Vicente that a carpenter eats better than anyone else.

Carpentering in San Vicente is in most cases a hereditary occupation. A boy usually learns the trade by assisting his father. Occasionally, however, a boy whose father is not a carpenter becomes an apprentice to a carpenter. In such cases there does not seem to be any fixed term of service. The youth works for small pay until he has acquired a fair degree of skill; he then earns such wages as he can, which he keeps for himself.

CARVED BOXES.

The making of fancy boxes in this town offers an example of a minor industry suddenly stimulated into life by the American occupation. It is the consensus of testimony that before that epoch the output amounted to practically nothing. It is said that a few small carved boxes that were offered for sale to the American troops were sold so readily and at such good prices that a number of men gave themselves entirely to making them. At the present time the workers who give their whole time to making boxes number about a dozen, without counting several women who assist in the carving. Boxes, most of them small, bring into San Vicente about 1,000 pesos a year.

The work, like all other manufacturing industries of San Vicente, is a household industry. There is no separate building set aside for it. Most of the makers of boxes work at their own homes, either inside the house or in the yard. A few hire an assistant or two.

As regards division of labor it may be said that some persons make a box from beginning to end. Others only carry it through

the earlier stages while another man—or woman—does the carving. In case assistants have to be hired, the compensation varies according to the kind of work done. A man who merely prepares the material and puts the box together receives about 40 centavos a day; a competent carver can command 75 centavos or even more.

The quality of the work leaves some things to be desired. The locks are ugly, dark, iron articles of Chinese manufacture, the hinges are unduly prominent, and the nails used are imperfectly concealed or not concealed at all.

The boxes usually made are small, varying in length from 15 to 30 centimeters, with a depth and width of about half as much. Large carved boxes, from 90 centimeters to 140 centimeters in length, are made to some extent usually to order. The two woods in common use for box making are *lanete* (*Wrightia* sp.) and *narra* (*Pterocarpus* sp.). The former is soft and nearly white; the latter is harder and always darker, although in the matter of color not all *narra* is alike. The designs are sometimes taken from Spanish or American catalogues of similar articles; sometimes they are furnished by a Filipino draftsman, who may or may not be himself a woodworker.

The material for making boxes is bought in the most expensive way. This statement applies also to all the wood manufactures of San Vicente. Each worker in the business does his buying independently of the others. He buys from time to time the small amount of wood which he can use wherever he can find it. Sometimes he gets it from a Vigan shop; sometimes he wanders about the country till he finds a suitable tree of the kind wanted, and buys it of the owner. In either case he brings to San Vicente only his own wood, when, in some cases, he could without any larger expenditure of time or money transport to his town enough for several woodworkers at the same time. In other words, there is none of the economy that comes from combination.

The disposal of the product is done in the same individualistic way. When the head of a family workshop has a dozen or two small boxes on hand he or one of his family usually goes on the road to peddle them. Vigan is the principal market at present.

Professional brokers in San Vicente manufactures of wood do not as yet exist, but there is reason to think that they are being developed. I know several men who at times buy boxes and other things by the dozen, advancing all or part of the price.

Some months ago a buyer for one of the largest department stores in the United States saw two boxes from San Vicente at the museum of the Bureau of Science in Manila, expressed satisfaction with the work and the price, and wished to communicate with some person or firm who could be depended upon to furnish him with a steady supply of the boxes at fixed prices. Neither the museum nor the provincial treasurer of Ilokos Sur knew of anyone to whom he could be referred, and San Vicente lost an opportunity to enter the American market. The absorbing capacity of the country about San Vicente for fancy boxes is very small, and the industry of making them will never be of importance, until trade connections are formed outside.

COMBS.

A good many thousand combs are made in San Vicente every year. A few are of carabao horn. The rest are of wood. The favorite material seems to be *kamagon* wood. The cheaper ones are made from the light-colored outer part of the wood; the more expensive ones are made from the very dark heartwood called by Americans "Philippine ebony." There are in San Vicente about a dozen comb-makers, and the town receives at least 1,000 pesos a year from the industry, probably more. Most of the combs are of the sort worn by women. The makers either work to order or take the combs to the market at Vigan. I have seen San Vicente combs in many towns of Ilokos Sur and Ilokos Norte, and they are said to be exported also to La Union, Nueva Vizcaya, Pangasinan, and Kagayan. Combs of this kind are a staple article in the Philippines and would seem to have a large potential market.

The process of making is simple. The wood is first barked and then sawed into convenient sections, which are next divided into small slabs. These slabs are dried over a smoldering fire of sawdust held in an earthen vessel. After this the outline of a comb, usually curved at the back, is drawn with a pencil; the small slab is then held fast in a vise while the teeth are formed with a saw. Finally the part of the slab outside the line marking the back of the comb is sawed away, and the comb is ready except for the polishing. The latter is sometimes done with a kind of leaf (*Ficus* sp.) possessing a rough surface, but more often with common sandpaper. The majority of combs are plain. Some are carved or engraved. The graving instrument may be a sharp, pointed knife, or a small graver's tool. There is one comb-maker in San Vicente who does better carving than

any of his rivals. The tool which I saw him using for engraving was made of a section of an umbrella rib brought to a point.

Carabao horn is made into combs by sawing it into convenient sections and then proceeding as with wood, except, of course, that it is not placed over a fire.

Comb-makers of San Vicente pick up their material in a casual fashion wherever it is most convenient. Sometimes a trader or emigrant returning from Kagayan brings home a piece of *kamagon* wood which he sells to the workers. Sometimes they buy their supplies in Vigan. At times they run out of heartwood entirely and get along with inferior material until some chance gives them an opportunity to replenish their stock. The comb-makers can take care of themselves in a case of petty bargaining for a few combs, but none of them that I know has any broad-gauge business ideas. I do not know any one who could be called a comb-broker.

IMAGES.

The making of images is a more important industry at San Vicente than either the making of combs or of boxes. I know of nearly 20 image-makers in the town, without counting a number of persons who make a living by making the platforms and cars used for images. Probably the industry of making images brings to the town between 2,000 and 3,000 pesos annually. The work is commonly done to order; orders come from many towns in northern Luzon. Some images are intended for use in churches, but my impression is that the greater part of the work is for private individuals who wish a crucifix, a Madonna, or the figure of a saint to set up in their own homes. I have been told by several of the workers that the business is not as good as it was formerly, owing to Protestant and skeptical influences in recent years, but I can not vouch for the accuracy of these statements. In conjunction with the industry of making statues a very minor industry, that of making clothes for the figures, exists in the town. This is carried on by the women.

Several kinds of wood are used in the work, sometimes in the same statue. *Lanete* is perhaps the most common. There is naturally a wide difference in the quality of the output, from the painfully crude to the graceful. The illustration (Plate IV, fig. 1) shows the best piece of work which I saw going on. The artist received his training from a Filipino artist who used to live in Vigan. He used, to guide him, a small illustration in a catalogue

of statues and other objects for devotional use. He used no models and made no drawings. The pieces of wood are marked with a pencil for sawing and chipping. After the image is roughly in shape, he trusts entirely to his eyes for guidance. He stated that glass eyes for statues were obtainable in Vigan; he, if I understood him aright, can make eyes out of glass. In his shop were a number of what resembled large wooden dolls without arms, which could be made into statues of various saints by additional touches and by affixing arms in various attitudes. The statue in the illustration was made partly hollow to lessen the weight.

Most of the San Vicente work in wooden statuary is crude. The head, arms, and trunk in a large statue are usually made of separate pieces of wood. I saw one statue of Christ, alleged to have been made in San Vicente, the hair of which, I was informed, was made of dyed maguey fiber, the eyelashes of cat fur, and the eyes of glass, while the representation of the crown of thorns seemed to me to be made of tin. The statue was thickly painted, splashes of red representing the blood.

CHAIRS AND OTHER FURNITURE.

San Vicente contains men capable of acceptable work in carving doors (Plate II, fig. 1) and other fittings for a house. There are also men who make carved wardrobes and beds to order. But the principal articles of wood made at San Vicente are chairs. About 5,000 pesos worth of these are sold by San Vicente workers annually. Sales of beds, tables, and wardrobes together amount to only about 1,000 pesos.

Chair making is carried on at the houses of the people, but it is common to hire a few outsiders to assist in the work. The largest number that I saw employed at any one place was ten. The work is somewhat specialized, but there is as yet no division of labor. There are men, for example, who make and put together all parts of a chair; there are more who do only certain parts of the work. The splitting of the rattan for the seats is usually intrusted to some one man of special skill at that kind of work, who is not expected to do anything else. He is paid 50 centavos a day, while planers and sawyers get only 2 pesos per week of six working days. The weaving of the rattan in the seats is usually done by women and children, who for their work on ordinary chairs receive 4 or 5 centavos per chair. They average 5 chairs a day. The man who puts the

chairs together is sometimes a specialist in the work. He gets 40 centavos a day. The commonest class of chairs is sold locally at from 12 to 14 pesos a dozen, if the sale is a free one. When a man advances the money to the manufacturer, he gets a reduction in price. The amount of this reduction is variable, and may be as much as one-third.

I found it difficult to determine the amount of profit which there is in making chairs, as the statements of many of the workers seemed intended to mislead. To the best of my judgment, the wood in a chair of the ordinary sort, if *palo maria*[2] is used, costs, laid down at the place of manufacture, about 15 centavos. The rattan for the seat costs about 5 centavos. With the average grade of management which prevails at San Vicente, a chair of this kind costs the manufacturer, if he does none of the work himself, between 70 and 80 centavos, allowing nothing for the use of the place of manufacture, which is the ground floor and yard of his house.

There is no uniformity in the manner of disposing of the manufactured articles. I know of several men who sometimes advance money to the manufacturers and get their money back in chairs. One of these men is at present trying to make furniture brokerage a regular business—I do not know with how much success.

If a manufacturer has enough capital to be able to get on without advances of money, he either disposes of his goods in person or engages some one to take them on a peddling tour. The peddling is either done from an ox cart, or the goods are taken to Kagayan or Pangasinan by sea. Naturally, the farther the chairs are taken from San Vicente, the more is charged for them. But probably the system most commonly used is for the consumer to send an order directly to the manufacturer.

The material is sometimes bought ready dressed from dealers in Vigan. More commonly the manufacturer or a member of his household sets out on the road and buys the first tree that suits his purpose. A good deal of the *palo maria* used in San Vicente comes from the towns of Lapog and Maksiñggal. *Narra*, the only other wood used at all commonly by San Vicente chairmakers, is usually bought ready dressed in Vigan.

The situation of the woodworking industry of San Vicente may be summed up as follows: There exists here a considerable

[2] *Calophyllum* sp., Iloko name, *bitaug*, pronounced as three syllables.

body of men, numbering perhaps as many as 125—excluding carpenters—who are professional workers in wood. These men do an annual business of not less than 10,000 pesos. This number does not include a good many other men who know something of the industry and turn their hands to it at odd times. The industry is entirely unorganized at the buying end, and nearly so at the selling end. The work is done entirely by hand. I do not know of any cheap and abundant supply of material in the neighborhood, nor of any other circumstance in favor of San Vicente as a woodworking center. The condition of the whole body of workers would probably be much improved if the majority of them emigrated to more favorable localities, a few dozen remaining to take care of the trade which has already been built up in the town.

ILLUSTRATIONS.

PLATE I.

FIG. 1. Models used in making chairs. (Photograph by Christie.)
2. Tools used in making furniture. (Photograph by Christie.)
3. Combs at different stages of manufacture. The row of five at the extreme right are of carabao horn. (Photograph by Cortes.)
4. Typical small boxes. (Photograph by Cortes.)

PLATE II.

FIG. 1. Carved doors, San Vicente. (Photograph by Christie.)
2. Chair-maker at work. (Photograph by Christie.)

PLATE III.

FIG. 1. Man preparing rattan for use in making furniture. (Photograph by Christie.)
2. Girl putting the rattan seat and back in a chair. (Photograph by Christie.)
3. Men making a bed. (Photograph by Christie.)

PLATE IV.

FIG. 1. Wood carver finishing a wooden statue. (Photograph by Christie.)
2. Sawyers at work. (Photograph by Christie.)
3. Carts loaded with San Vicente furniture. (Photograph by Christie.)

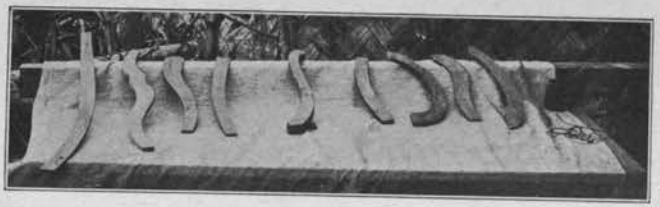


Fig. 1. Models used in making chairs.

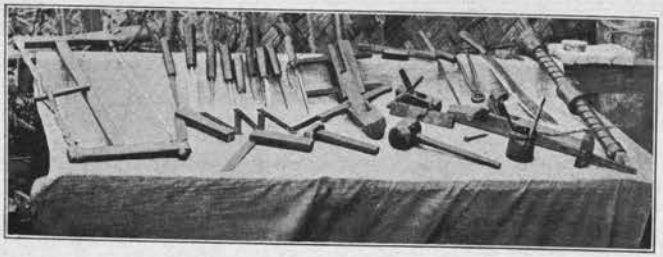


Fig. 2. Tools used in making furniture.

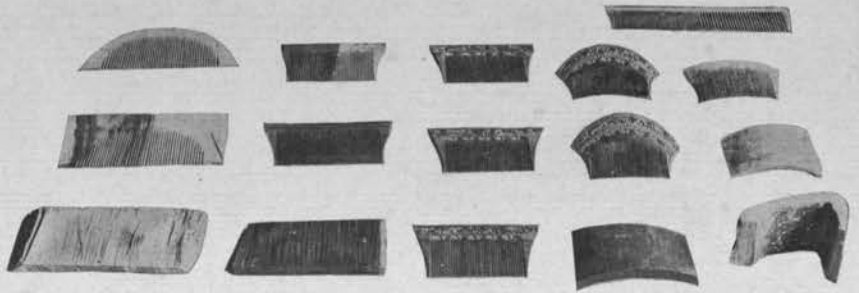


Fig. 3. Combs at different stages of manufacture.

Fig. 4. Typical small boxes.

PLATE I.

Fig. 1. Carved doors, San Vicente.

Fig. 2. Chair-maker at work.

PLATE II.

Fig. 1. Man preparing rattan.

Fig. 2. Girl putting the rattan seat and back in a chair.

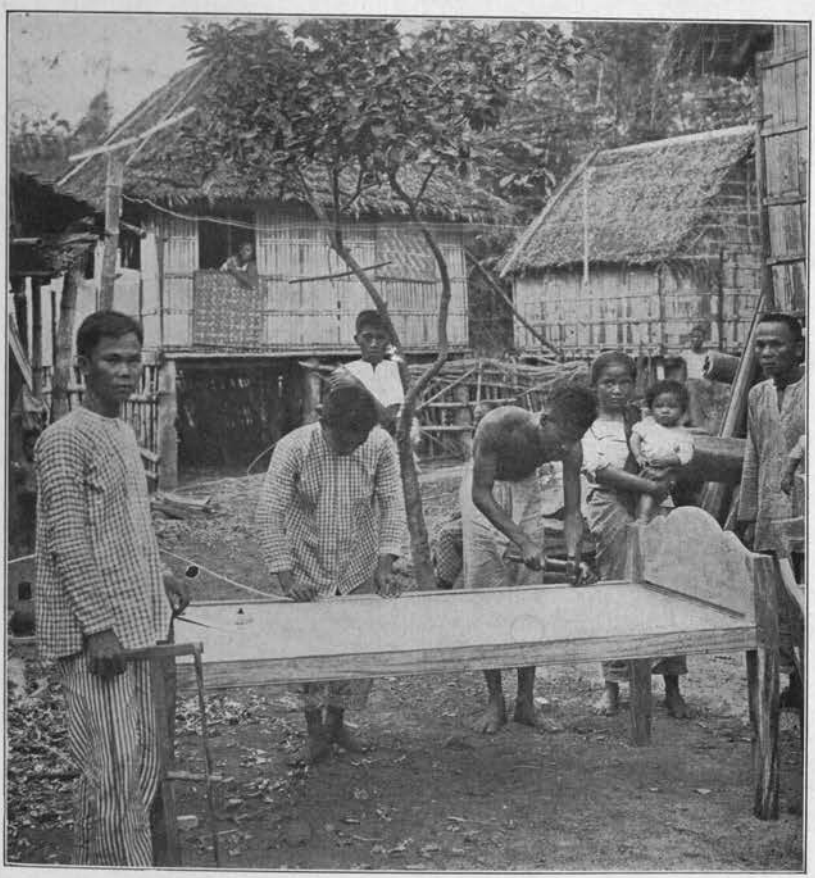


Fig. 3. Men making a bed.

PLATE III.

Fig. 1. Wood carver finishing a wooden statue.

Fig. 2. Sawyers at work.

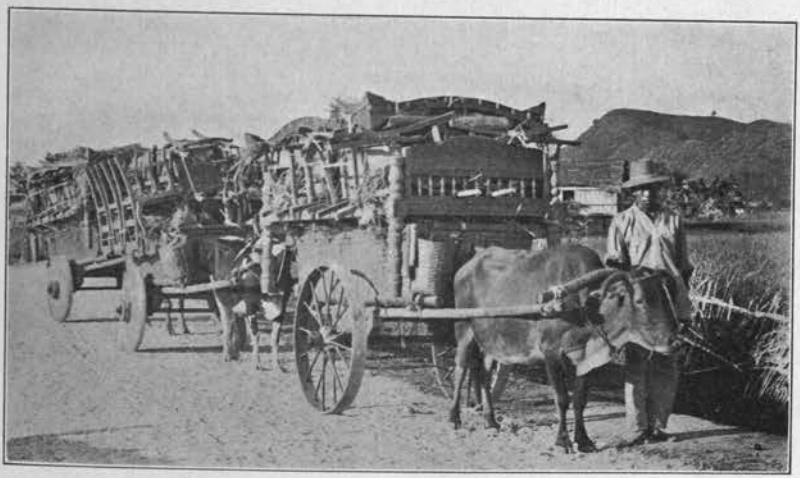


Fig. 3. Carts loaded with San Vicente furniture.

PLATE IV.

THE PHILIPPINE JOURNAL OF SCIENCE,
D. General Biology, Ethnology and Anthropology.
Vol. VII, No. 4, 1912.

DESCRIPTION OF A NEW GECKO FROM BOTEL TOBAGO ISLAND.

By MASAMITSU OSHIMA.
(*Of the Institute of Science, Government of Formosa.*)

In June, 1912, I collected a pair of geckos at Kōtōsho (Botel Tobago Island, dependency of Formosa) that appear to represent an undescribed species. I take great pleasure in dedicating it to my collector, Yonetaro Kikuchi.

Gecko kikuchii sp. nov.

Habitat.—Kōtōsho, Formosa.

Type.—Catalogue No. 1; Institute of Science, Government of Formosa; Kōtōsho (Botel Tobago Island); June 14, 1911; M. Oshima, collector.

Description of type.—Rostral pentagonal, about twice as wide as high, bounded above by 2 large internasals and 1 small scale between the latter, the supralateral margin entering the nostrils; nostril between first supralabial, rostral, large internasal, and 2 larger shields above and behind; distance between nostril and eye considerably greater than the distance between eye and ear-opening; diameter of eye nearly equal to one-half the distance between eye and tip of snout; ear-opening large and oval, its longest diameter one-half the diameter of eye; 13 supralabials; mental trigonal, larger than the adjacent lower labials; 10 lower labials; behind mental a pair of median, somewhat elongated chin-shields, on either postero-lateral side of which another similar but smaller shield, 1 pentagonal shield between the latter; whole upper surface covered with granules, those on the snout considerably the largest; among the granules, from the ear-opening backward to the basal half of the tail, numerous small, rounded tubercles, their mutual distance averaging about one-half the diameter of ear-opening, not arranged in regular

longitudinal series, though about 18 tubercles can be counted in a line across the back; upper surface of limbs covered with granules and tubercles like the back; lower surface of body and limbs covered with imbricate scales, except the throat and anterior portion of neck, which are covered with granules of the size of those on the back; first toe with 13 lamellæ, forth with 14 underneath; second, third, and fourth toes connected by a basal web; a series of 24 femoral pores on each side, of which the inner 10 are oval; the others, round; tail gradually tapering, slightly depressed, not annulate, upper surface covered with small scales and 4 to 6 rows of tubercles; underneath, scales larger, with a median series of wide plates, all of the same width; color (in alcohol) drab gray above, with 2 obscure, dusky, longitudinal bands on the back; pale ill-defined markings on both upper and lower labials; under side whitish.

Measurement.	Mm.
Total length	182
Snout to vent	80
Vent to tip of tail	102
Snout to ear-opening	22
Greatest width of head	18
Fore leg, from axilla,	25
Hind leg, from groin,	35

The adult female differs from the male, chiefly in the absence of the preanal pores and of the basal web on the toes; back with 9 pairs of ill-defined black spots.

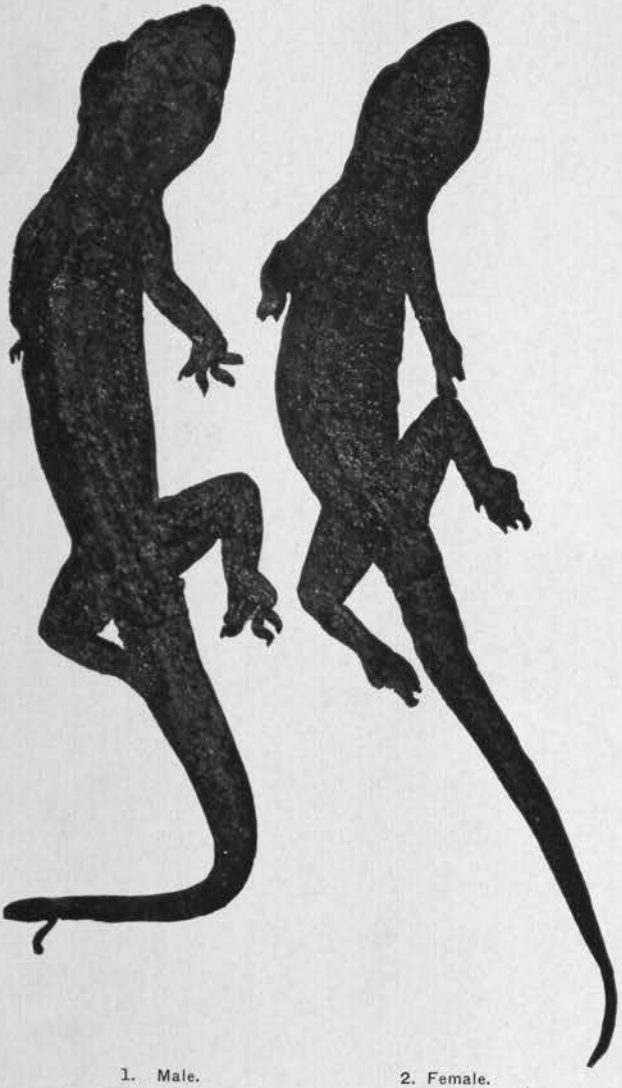
ILLUSTRATIONS.

PLATE I.

Gecko kikuchii sp. nov., dorsal view of (1) male and (2) female, natural size.

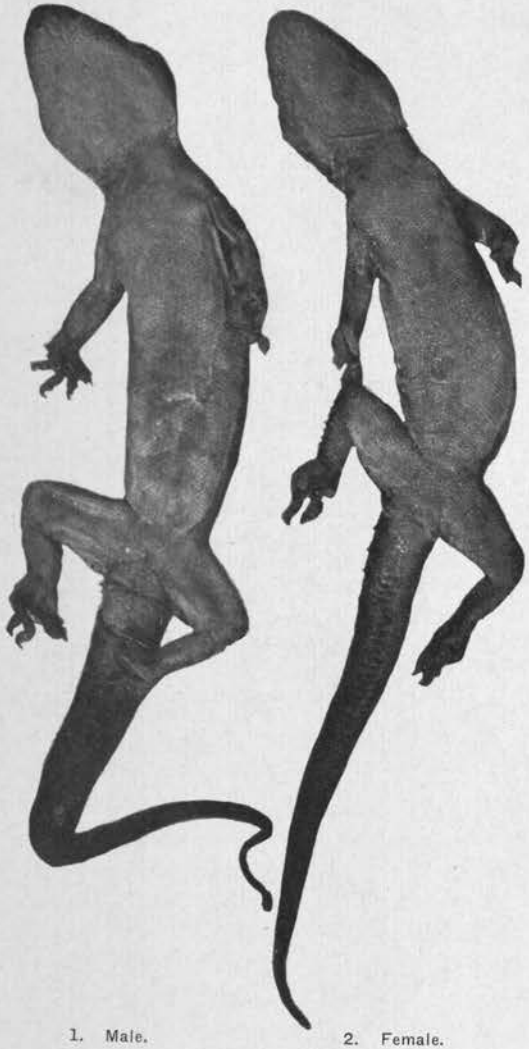
PLATE II.

Gecko kikuchii sp. nov., ventral view of (1) male and (2) female, natural size.



1. Male. 2. Female.

PLATE I. GECKO KIKUCHII sp. nov. Dorsal view (natural size).



1. Male. 2. Female.

PLATE II. GECKO KIKUCHII sp. nov. Ventral view (natural size).

THE PHILIPPINE JOURNAL OF SCIENCE,
D. General Biology, Ethnology and Anthropology.
Vol. VII, No. 4, 1912.

NEUE STAPHYLINIDEN DER PHILIPPINEN.

VON MAX BERNHAUER.
(*Grünburg, Ober-Oesterreich.*)

Herr W. Schultze, vom Bureau of Science in Manila, hatte die Güte mir eine Anzahl Staphyliniden einzusenden, welche auf den Philippinen von verschiedenen Sammlern gefangen worden sind.

Indem ich Herrn Schultze für die mir übertragene Bearbeitung des Materiales verbindlichen Dank ausspreche, lasse ich die Beschreibung der in demselben vorgefundenen neuen Arten folgen:

Priochirus (Plastus) philippinus sp. nov.

Dem *Priochirus cavifrons* Fauv. nahe verwandt, aber fast dreimal grösser, ausserdem in folgenden Punkten verschieden:

Der Kopf ist im Verhältnisse zum Halsschilde kleiner und schmäler, die Fühler länger, die vorletzten Fühlerglieder weniger quer: die seitlichen Stirnzapfen sind viel länger und schlanker; der kleine Zahn auf der Unterseite ist viel schärfer und grösser; ebenso treten die mittleren Stirnzähnchen stärker hervor; der Vorderrand der Stirn ist über den Clypeus stark vorgezogen, der Stirnrand ist daher viel schärfer vortretend. Das Halsschild ist etwas flacher und vor den Hinterecken viel spärlicher punktiert, der Hinterleib endlich ist weitläufiger und feiner punktiert.

Von *sexdentatus* Bernh. dem die neue Art habituell sehr ähnlich ist, lässt sich die letztere auf den ersten Blick durch das gefurchte erste Fühlerglied sofort trennen.

Länge: 16 mm.

LUZON, Benguet, Baguio. (*H. M. Curran*, Coll.) No. 9921 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Priochirus (Plastus) currani sp. nov.

Dem *Priochirus sexdentatus* Bernh. noch näher verwandt als die vorige Art, mit ungefurchtem ersten Fühlergliede, jedoch durch nachfolgende Merkmale von ihm sicher verschieden.

Der seitliche Stirnzapfen ist viel kürzer, das freie Ende ist kaum halb so lang als der Stirneindruck, das untere Zähnchen ist kleiner, die mittleren Zähnchen sind durch eine viel breitere bogige Ausrandung getrennt, so dass der Raum zwischen denselben viel breiter ist, als die Entfernung von den Stirnzapfen, der Stirneindruck selbst ist in der Mittellinie ziemlich tief der Länge nach eingedrückt.

Die Fühler sind viel länger und schlanker, die vorletzten Glieder weniger stark quer.

Das Halsschild ist etwas flacher, am herabgebogenen Seitenrande spärlicher punktiert, die punktierte Zone ist von der Seitenrandleiste durch einen breiten glatten unpunktierten Zwischenraum getrennt, während bei *sexdentatus* diese punktierte Zone bis zur Randleiste geht.

Die Fühler sind viel länger und schlanker, die vorletzten und weitläufiger punktiert.

Länge: 10.5 mm.

LUZON, Benguet, Mt. Pulog. (*H. M. Curran*, Coll.) No. 10262 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Priochirus (Plastus) schultzei sp. nov.

Mit *Priochirus luzonicus* Fauv. sehr nahe verwandt, aber bei einiger Aufmerksamkeit leicht durch folgende Unterschiede zu erkennen.

Der Stirneindruck ist flacher, die Mittelfurche auf demselben viel schärfer, die seitlichen Zähne viel stärker entwickelt als die mittleren und ragen mehr als doppelt so weit über den Stirnvorderrand als die mittleren, während bei *luzonicus* Fauv. die seitlichen Zähnchen die mittleren nur ganz wenig überragen. Die Fläche über den mittleren Zähnchen ist bei der neuen Art flach, während sie bei *luzonicus* beulenartig erhoben ist. Ein weiterer sehr markanter Unterschied liegt darin, dass der Seitenrand im ausgebuchteten Teile vor den Hinterecken scharf gerandet ist während dieser Teil bei *luzonicus* ungerandet ist.

Endlich sind die Fühler entschieden kürzer und die vorletzten Glieder stärker quer als bei *luzonicus*.

Länge: 7.5 mm.

MINDORO, Bongabon. (*W. Schultze,* Coll.) No. 8400 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Priochirus (Plastus) manilensis sp. nov.

Ebenfalls mit *luzonicus* Fauv. nahe verwandt, von demselben aber leicht durch das hinten vollständig gerandete Halsschild, viel kürzere Fühler, den an der Basis der Segmente ziemlich dicht punktierten Hinterleib sowie die Kopfbewehrung verschieden; durch letztere ist die Art auch sofort von der vorherigen Art zu unterscheiden.

Der Stirneindruck ist ähnlich flach ausgebreitet wie bei *schultzei,* besitzt jedoch längs der Mittellinie keine Furche, die Zähnchen sind viel kleiner, die seitlichen ragen nur mässig weiter vor als die mittleren, diese sind sehr klein und stehen einander viel näher als den seitlichen.

Die Fühler sind kurz, die vorletzten Glieder ungefähr doppelt so breit als lang.

Länge: 7.5 mm.

LUZON, Manila. (*W. Schultze,* Coll.) No. 2510 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Oxytelus megaceros var. flavicollis nov.

Die neue Form unterscheidet sich vom typischen *megaceros* durch kleinere Gestalt (3 mm.), etwas kürzere Fühler und andere Färbung und dürfte sich vielleicht beim Hervorkommen grösseren Materiales als eine eigene Art erweisen.

Während bei *megaceros* Stammform die Flügeldecken weissgelb und der lichteste Teil des Körpers sind, ist dies hier umgekehrt; die Flügeldecken sind dunkel gelbbraun, ähnlich wie der Hinterleib, das Halsschild ist hellgelb, der Kopf gelblich geschwärzt.

Bisher ist mir diese Form nur von den Philippinen bekannt geworden.

Bledius compressicollis sp. nov.

Eine durch das seitlich stark eingedrückte Halsschild und die Geschlechtsauszeichnung des ♂ sehr ausgezeichnete und leicht kenntliche Art.

♂ Rötlichgelb, der Kopf dunkler, das Halsschild mehr rötlich, die Beine, Taster und Fühlerwurzel hellgelb.

Der Kopf ist schmäler als das Halsschild, mit Ausnahme des matt und grob chagrinierten Stirneindruckes, glänzend glatt,

unpunktiert; der Scheitel ist hinten in einen scharf spitzigen, grossen Höcker, die Stirn vor den Augen in je einen breiten, fast parallelen, hoch über die Stirnfläche emporragenden Fortsatz erhoben, welcher an der Spitze ausgerandet und innen in einen ziemlich schmalen Dorn ausgezogen ist. Die Fühler sind mässig lang, ihre vorletzten Glieder nur wenig breiter als lang.

Halsschild vorn fast breiter als die Flügeldecken, an den Schultern, so lang als breit, nach rückwärts stark verengt, an den Seiten vorn gerundet, dann geradlinig und im letzten Drittel wieder gerundet und daselbst plötzlich verengt, in der Mitte der Oberfläche stark erhoben, daselbst glatt, unpunktiert, und fein gefurcht, an den Seiten stark zusammengedrückt, kräftig und dicht punktiert, im Grunde deutlich chagrinirt, vorn tief schmal eingedrückt, der Eindruck unpunktiert und rückwärts gegen die punktierte Halsschildoberfläche wulstig abgesetzt. Der Vorderrand des Halsschildes ist in der Mitte in einen gegen die Spitze rasch verjüngten, schmalen, die Hälfte der Halsschildlänge erreichenden nach unten gebogenen Dorn ausgezogen.

Flügeldecken deutlich kürzer als das Halsschild, nach rückwärts etwas erweitert, kräftig und dicht punktiert.

Der Hinterleib zeigt an den Seiten und Hinterrändern der 4 ersten freiliegenden Tergite eine seichte runzelige mässig dichte Punktierung.

Länge: 4 mm. (bei ziemlich eingezogenem Hinterleibe).

Die Unterseite des Hinterleibes zeigt keine besondere Geschlechtsauszeichnung des ♂ und ist ziemlich gleichmässig dicht punktiert.

LUZON, Manila. (*C. S. Banks,* Coll.) No. 5777 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Bledius philippinus sp. nov.

Den *Bledius brunnipennis* Fabr. nahe verwandt, jedoch viel kleiner, von hellerer Färbung und besonders durch die viel weitläufigere Punktierung und den stärkeren Glanz des Halsschildes und der Flügeldecken leicht zu unterscheiden.

Pechbraun mit hellerer Hinterleibsspitze, die Fühlerwurzel und die Beine rötlich gelb. Kopf matt chagriniert, beim ♂ mit zwei langen, spitzigen Stirnfortsätzen ähnlich wie bei *tricornis.*

Halsschild etwas breiter als lang, in der Mittellinie tief gefurcht, kräftig und dicht, gegen die Mitte zu weniger dicht punktiert, beim ♂ vorn in einen schmalen langen gleichbreiten Dorn verlängert, der fast so lang als das Halsschild ist.

Flügeldecken deutlich länger als das Halsschild, kräftig und dicht punktiert, Abdomen grob und ziemlich dicht punktiert und mit langen Haaren dicht bekleidet.

Länge: 6 mm.

LUZON, Manila. (*C. S. Banks,* Coll.) Nos. 2398, 2410, 8063 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Stenus montalbanensis sp. nov.

Dem *Stenus arachnipes* Bernh. in Gestalt und Färbung sehr ähnlich, aber in folgenden Punkten verschieden:

Der Kopf ist etwas stärker punktiert, die Augen im Verhältnisse zu demselben grösser.

Das Halsschild ist doppelt so grob und viel weitläufiger punktiert. Die Flügeldecken viel kürzer, schmäler, gröber und weitläufiger punktiert, der Hinterleib endlich ist ebenfalls stärker und weitläufiger punktiert.

Die Flügeldecken sind deutlich etwas kürzer als das Halsschild; die Schultern stehen weniger vor als bei *arachnipes* Bernh.

Länge: 5 mm.

LUZON, Rizal, Montalban Gorge. (*C. S. Banks,* Coll.) No. 5456 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Stenus philippinus sp. nov.

In die Gruppe des *acuminatus* Krtz. gehörig, von demselben, sowie von *planifrons* Fauv. durch weniger dichte Punktierung des Körpers und namentlich des Abdomens sofort zu unterscheiden.

Schwarz mit sehr undeutlichem Erzschimmer, die Fühler bis auf das schwarze erste Glied und die gebräunte Spitze, die Taster und die Beine rötlichgelb, die äusserste Spitze der Schenkel schwärzlich.

Kopf breit, so breit als die Flügeldecken, flach ausgehöhlt, mit schwacher Andeutung von 2 geglätteten Längsfurchen, kräftig und dicht punktiert, mit glänzenden Zwischenräumen der Punkte, Fühler ziemlich kurz, mit entwickelter Keule.

Halsschild viel schmäler als die Flügeldecken, länger als breit, in der Mitte am breitesten, hinter der Mitte etwas ausgebuchtet, dicht und kräftig runzelig punktiert, mit schmalen erhobenen glänzenden Zwischenräumen.

Flügeldecken an der Naht etwas kürzer als das Halsschild, fast quadratisch, kräftig und dicht runzelig punktiert, die schmalen Zwischenräume der Punkte glänzend.

Hinterleib ziemlich glänzend, kräftig und dicht, hinten feiner und weitläufiger punktiert.

Länge: 3.5 mm.

Beim ♂ ist das fünfte Sternit kaum ausgebuchtet, das sechste, weniger tief dreieckig ausgerandet.

Paederus philippinus sp. nov.

In der Körpergestalt und Farbe unserem europäischen *ruficollis* Fauv. sehr ähnlich, jedoch noch kleiner als *gemellus* Krtz.

Die Färbung ist etwas dunkler blau als bei *ruficollis*, der Hinterleib fast schwarz, die Punktierung der Flügeldecken ist stärker und viel weitläufiger, zugleich sind die letzteren, im Verhältniss zum Halsschilde, deutlich länger.

Am leichtesten ist die neue Art jedoch an der Gestalt des Kopfes von *ruficollis* Fauv. zu unterscheiden.

Der Kopf ist nämlich viel länger und schmäler und nach rückwärts geradliniger verengt, ausserdem ist derselbe auch stärker und dichter punktiert.

Länge: 6 mm.

LUZON, Rizal, Montalban Gorge. (*C. S. Banks*, Coll.) No. 5458 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Medon philippinus sp. nov.

Von gleichbreiter Gestalt, bräunlich schwarz, matt, der breite Hinterrand sowie die Hinterecken der Flügeldecken bis zum letzten Fünftel der Flügeldeckenlänge hellgelb, die Fühler und Taster gelblichrot, die Hinterränder der letzten Hinterleibsringe sowie die Beine gelb, die Schenkel teilweise angedunkelt.

Kopf so breit als das Halsschild, so breit als bis zum Vorderrande lang, von den Augen nach rückwärts vollkommen parallel, vor denselben verjüngt, hinten gerade abgestutzt mit kurz verrundeten Hinterecken. Fühler ziemlich lang, die vorletzten Glieder länger als breit. Die Oberseite des Kopfes ist sehr fein und äusserst dicht punktiert.

Halsschild etwas schmäler als die Flügeldecken, fast so lang als breit, an den Seiten gerade, nach rückwärts kaum verengt, die Hinterecken verrundet, längs der Mittellinie mit einer schmalen glänzenden Kiellinie, sonst wo möglich noch feiner und dichter als der Kopf punktiert, vollkommen matt.

Flügeldecken um ein Stück länger als das Halsschild, zusammen länger als breit, lang rechteckig, ähnlich wie das Halsschild punktiert.

Abdomen äusserst fein und äusserst dicht chagrinartig punktiert und seidenschimmernd behaart.

Beim ♂ ist das sechste Sternit seicht, das fünfte kaum ausgerandet, besitzt jedoch auf dem grössten Teile des Hinterrandes eine Reihe dichtstehender, starrer, kurzer, schwarzer Börstchen, welche kammartig angeordnet sind.

Die neue Art gehört in die nächste Nähe von *Medon robustus* Bernh., ist aber durch die ausserordentlich dichte Punktierung des ganzen Körpers sofort von demselben zu unterscheiden.

Länge: 5 mm.

LUZON, Rizal, Montalban Gorge. (*C. S. Banks,* Coll.) No. 5644 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Scopaeus montalbanensis sp. nov.

Unter den übrigen matten Arten des Subgenus *Scopaeus* sens. str. der Indo-malayischen Fauna durch die Färbung, überdies durch den langen Kopf ausgezeichnet.

Dunkelschwarz, der Hinterrand der Flügeldecken breit hellgelb gesäumt, die Fühler, Taster und Beine pechbraun, die Schienen und Tarsen gelblich.

Der ganze Körper ist äusserst dicht und fein punktiert und grau seidenschimmernd behaart, die Punkte selbst unter stärkster Lupenvergrösserung nicht sichtbar. Auf den Flügeldecken ist die Punktierung ein klein wenig feiner, als am Kopf und etwas rauh.

Der Kopf ist so breit als das Halsschild, länger als breit, fast parallelseitig, nach rückwärts kaum unmerklich verengt. Das Halsschild ist um ein Stück schmäler als die Flügeldecken, um die Hälfte länger als breit, im ersten Drittel am breitesten, längs der Mittellinie ausserordentlich schmal geglättet.

Die Flügeldecken sind ungefähr so lang als das Halsschild, parallelseitig, der Hinterleib nach rückwärts stark keulenartig erweitert und dann plötzlich wieder verjüngt.

Beim ♂ ist das sechste Sternit sehr tief spitzwinklig ausgeschnitten, das fünfte ist am Hinterrande tief doppelbuchtig, der Mittellappen halbkreisförmig vorgezogen.

Länge: 3.5 mm.

LUZON, Rizal, Montalban Gorge. (*C. S. Banks,* Coll.) No. 5650 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Cryptobium banksi sp. nov.

Dem *Cryptobium abdominale* Motsch. nahe verwandt, aber von allen seinen Formen durch um die Hälfte grössere Gestalt und die kräftigere und zweimal weitläufigere Punktierung der Flügeldecken sofort zu unterscheiden.

Die Fühler sind zugleich etwas länger, der Kopf fast noch schmäler und gestreckter, kaum so breit als das Halsschild, dieses ist etwas gröber und weitläufiger punktiert.

Die Farbe ist schwarz, der Spitzenrand der Flügeldecken ist gelbrot, die Fühler und Taster rostrot, die Beine weissgelb, der Hinterrand der letzten Hinterleibsringe rötlich.

Länge: 8.5 mm.

LUZON, Rizal, Montalban Gorge. (*C. S. Banks*, Coll.) No. 5645 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Cryptobium abdominale Motsch.

Kommt auf den Philippinen in einer ganz roten Form vor, von der nur die weissgelben Beine scharf abstechen und welche ich var. nov. *rubiginosum* benenne.

Thyreocephalus philippinus sp. nov.

Tiefschwarz, glänzend, die Flügeldecken dunkel erzfarbig, der Hinterleib mit schwächerem Erzglanze, die Hinterleibsspitze rötlich, die Fühler, Taster und Beine dunkel rostrot.

Kopf, breiter als das Halsschild, länger als breit, ziemlich flach, nach rückwärts etwas erweitert, mit länglichen, kräftigen Nabelpunkten dicht besetzt, längs der Mittellinie viel feiner und weitläufiger, vorn nur sehr fein und spärlich punktiert.

Halsschild vorn so breit als die Flügeldecken zwischen den Schultern, nach rückwärts ausgeschweift verengt, lackglänzend, auf der Scheibe unpunktiert, nur gegen die Vorderecken und an den Seiten mit einigen Punkten und dem grossen, von den Seiten ziemlich stark abgerücktem Porenpunkte.

Flügeldecken so lang als das Halsschild, ziemlich kräftig, tief und ziemlich dicht punktiert.

Hinterleib kräftig und dicht, rauh, längs der Mitte und dem achten Tergit viel feiner und weitläufig punktiert.

Länge: 10 mm.

LUZON, Rizal, Montalban Gorge. (*C. S. Banks*, Coll.) No. 5643 der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Amichrotus merritti sp. nov.

Vollkommen matt, Kopf und Hinterleib tiefschwarz, Halsschild und Flügeldecken sowie die ganze Brust rot, der Hinterrand der Flügeldecken, mit Ausnahme der Nahtpartie, je eine Apikalmakel, am Seitenrande der ersten 3 freiliegenden Tergite, zwei grosse Makeln, am Hinterrande des dritten freiliegenden Tergites, welche nach vorn bis zum basalen Drittel reichen, von einander durch einen mässig breiten Zwischenraum und von den seitlichen Randmakeln nur sehr schmal getrennt sind und die Basalhälfte des achten (sechsten freiliegenden) Tergites sowie die Beine weisslichgelb, die Aussenseite der Vorderschenkel und die Apikalpartie der übrigen Schenkel gebräunt.

Kopf breiter als das Halsschild, ungefähr um ein Viertel breiter als lang, mit sehr grossen Augen, deren Längsdurchmesser wohl mehr als viermal so lang als die Schläfen ist, auf der Oberseite vorn zwischen den Augen matt gerunzelt, hinter dieser Partie äusserst dicht und mässig stark nabelig gerunzelt-punktiert, längs der Mittellinie zwischen den Augen mit einem schmalen und mässig langem Spiegelfleck.

An den schlanken Fühlern ist das Endglied schwarz, die 3 vorhergehenden weissgelb, die Glieder 4 bis 7 tiefschwarz, die 3 Wurzelglieder schmutzig gelblichrot; die vorletzten Glieder sind länger als breit. Die Mandibeln und Taster sind sehr schlank und lang.

Halsschild viel schmäler als die Flügeldecken, länger als breit, herzförmig, nach rückwärts stark verengt und ausgebuchtet, überall äusserst dicht runzelig punktiert, vollkommen matt, dicht goldgelb behaart.

Flügeldecken etwas länger als das Halsschild, ähnlich wie dieses skulptiert. Hinterleib äusserst dicht schwarz tomentiert, die Grundskulptur nicht sichtbar, das achte Tergit fein und weitläufig punktiert.

Die Vorderschenkel des einzigen vorläufig vorhandenen Stückes sind auf der Unterseite dicht bürstenartig behaart; ob dies eine Geschlechtsauszeichnung des ♂ ist, wage ich vorläufig nicht zu behaupten. Erstes Glied der Hintertarsen so lang als die 3 folgenden Glieder.

Länge: 15 mm. (Bei ausgezogenem Hinterleibe.)

LUZON, Laguna, Mt. Banajao. (*M. L. Merritt*, Coll.) Type, No. 8075 des Bureau of Science, in meiner Sammlung.

Philonthus convexus sp. nov.

Dem *Philonthus inconstans* Sharp aus Japan ausserordentlich nahe verwandt und von demselben nur durch grössere Gestalt,

nach hinten deutlicher verengtem Kopf, kürzeren, nach vorn deutlich verschmälertem Halsschild und insbesondere durch viel weitläufiger und stärker punktierte Flügeldecken verschieden.

Länge: 6 mm.

LUZON, Rizal, Montalban Gorge. (*C. S. Banks*, Coll.) Type, No. 5647 des Bureau of Science, in meiner Sammlung.

Aleochara philippina sp. nov.

Eine durch die Färbung der Fühler und des tiefschwarzen, stark glänzenden Körpers ausgezeichnete Art der *curtula* Gruppe.

Tiefschwarz, stark glänzend, die Beine bräunlich, die Fühler rötlichgelb, die 4 ersten Glieder scharf abgegrenzt schwarz.

Kopf sehr klein, viel schmäler als das halbe Halsschild, grob und mässig dicht punktiert. Halsschild hinten so breit als die Flügeldecken, um ein Viertel breiter als lang, nach vorn stark verengt, an den Seiten gerundet, vor den vollkommen verrundeten Hinterecken stark schräg eingedrückt, überall mässig stark und wenig dicht punktiert.

Flügeldecken etwas kürzer als das Halsschild, zusammen stark quer, innerhalb der Hinterwinkel nicht ausgebuchtet, ebenso stark, aber doppelt dichter punktiert als das Halsschild. Hinterleib weniger stark und viel weitläufiger punktiert als die Flügeldecken.

Länge: 5 mm.

LUZON, Laguna, Mt. Banajao. (*C. S. Banks*, Coll.) Type, No. 7202 des Bureau of Science, in meiner Sammlung.

THE PHILIPPINE JOURNAL OF SCIENCE,
D. General Biology, Ethnology and Anthropology.
Vol. VII, No. 4, 1912.

NACHTRAEGE UND BERICHTIGUNGEN ZU: „DIE RUTELIDEN DER PHILIPPINISCHEN INSELN."[1]

VON FR. OHAUS.
(*Steglitz, Berlin, Germany.*)

Anomala (Heteroplia) sanchezi sp. nov.

Anomala leotaudii Blanchard similis, at multo major. Oblonga, cylindrica, nitida. Clipeus transversus lateribus, parallelis, angulis anticis paulo rotundatis, rufus, margine anguste reflexo fusco, tota superficie rugulose punctatus subopacus. Sutura frontalis recta, frons triangulariter leviter impressa sicut clipeus rugulose punctata subopaca, vertex disperse punctulata nitida. Thorax fuscus certo visu viridiolivaceus margine laterali sat late flavo, undique dense, hic illic confluenter ac rugulose punctatus, medio angulatim fere lateribus dilatatus, lateribus antice valde convergentibus, angulis anticis paulo productis, posticis rectis vix rotundatis. Scutellum rufum fuscomarginatum dense confluenter punctatum. Elytra postice paulo ampliata fusca costis et rugis elvatis flavis, regulariter striatopunctata et praeterea tota superficie punctis parvis dense obtecta, humeris et callis apicalibus prominentibus rugulosis. Pygidium flavum fusco variegatum fortiter rugulose punctatum lateribus et apice sparsim pilis longis flavis obsitum. Subtus cum pedibus flava, tibiis posticis, tarsis, genibus et dentibus tibiarum fuscis; abdominis segmenta fortiter rugulose punctata, pectus dense et longe flavopilosum; tibiae anticae indistincte tridentatae; antennarum clava in ♂ elongata.

♂ ♀ Long. 15–17, lat. 9–9.5 mm.

LUZON, Benguet, Baguio. (*F. Sanchez, S. J.* legit.)

Type ♂ und ♀, No. 13287 in der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Die undeutlich 3-zähnigen Vorderschienen bringen die Art in

[1] *Phil. Journ. Sci., Sec. D* (1910), 5, 233.

Beziehung zur Untergattung *Heteroplia*, wofür auch die Verlängerung der Fühlerkeule beim ♂ spricht, während die Sculptur der Flügeldecken für *Heteroplia* ungewohnt ist. Die Rippenbildung geht hier sehr weit und führt stellenweise zur vollständigen Auflösung in Punktreihen und Höckerchen. Die Nahtrippe ist regelmässig, nur gegen die Spitze hin etwas verschmälert. Im Interstitium subsuturale stehen 2 secundäre Rippen und zwischen diesen 2 tertiäre, oder der Raum zwischen den beiden secundären Rippen ist mehr oder weniger mit unregelmässigen Punkten, die im Grunde schwarzbraun sind, und gelblichen Höckerchen angefüllt; die 2te primäre Rippe ist von der Mitte ab durch eine etwas unregelmässige Punktreihe geteilt; das 2te Interstitium enthält 2 secundäre und zwischen diesen eine tertiäre Rippe; die 3te primäre Rippe ist zumeist einfach, wie die 3 folgenden an der Seite, in den äusseren Interstitien stehen 2 secundäre Rippen. Die ganze Oberfläche ist ziemlich dicht mit feinen Pünktchen übersät, die auf den Schultern und Spitzenbuckeln gröber werden und dadurch die Sculptur an diesen Stellen undeutlich machen.

Anomala exarata Burm.

Eine Untersuchung der Type im Hallenser Museum zeigte mir, dass ich diese Art nach der Beschreibung allein nicht richtig bestimmt hatte. Sie ist höher gewölbt und schmäler als die *sulcatula* Eschsch; ihre Grundfarbe braun mit hellgrünem Erzglanz, alle Rippen hoch gewölbt, in den 3 Interstitien auf der Scheibe der Deckflügel je 2 regelmässige secundäre convexe Rippen, Kopf, Vorderrücken und Schildchen sind ziemlich weitläufig und kräftig punktirt.

Ich habe die Art bisher nur von Celebes, Macassar, und von Klein Key (*H. Kühn* S.) erhalten und möchte fast bezweifeln, dass sie auf den Philippinen vorkommt. Was ich bisher für *A. exarata* Burm. hielt und bestimmte, ist eine der vielen Varietäten der *A. sulcatula* Eschsch., die offenbar im Stadium einer starken Variabilität sich befindet, die sich eigentümlicher Weise fast ganz auf die Sculptur der Deckflügel beschränkt und in einer intensiven Neubildung von Punktreihen und secundären Rippen äussert.[2]

Anomala (Euchlora) dasypyga Burm.

Die Type dieser Art ist ein ♂, nicht ein ♀, wie Burmeister angiebt, und misst 18 millimeter, nicht 14–16, Kopf, Halsschild

[2] *Ent. Zeitg.* Stett. (1897), 386.

und Schildchen sind grasgrün nur die Deckflügel olivengrün (braungrün). Die mir vorliegenden Stücke sind alle kleiner als die Type, 12–16 mill., stimmen aber in allen wesentlichen Merkmalen mit dieser überein, so dass ich aus dem Unterschied in der Grösse keinen Grund herleite, sie als spezifisch verschieden von dieser zu betrachten, zumal auch andere philippinische *Euchlora*-Arten beträchtlich in der Grösse variiren. Besonders charakteristisch für die Art ist ausser der grauweissen ziemlich dichten Behaarung des Pygidiums und der Seiten der Sternite der auffallend breite häutige Randsaum an den Deckflügeln, der zumeist ½ mill. breit und auf der Aussenseite dicht gestreift ist; er besteht aus 2 Lamellen, deren äussere (obere) doppelt so lang ist als die innere (untere), zuweilen abreisst und auf die Deckflügel zurück geschlagen wird; nahe dem Seitenrand der Deckflügel ist dieser häutige Randsaum braun, am Aussenrand gelb, durchscheinend.

Anomala (Euchlora) cladera sp. nov.

E. xanthoptera Blanch. (Ind. orient), et *praematura* Ohs. (Ins. Philipp.) proxime affines. Ovata, sat convexa, nitida, capite, thorace scutelloque viridiolivaceis, thoracis lateribus, elytris, pygidio, femoribus omnibus et coxis anticis flavotestaceis, corpore subtus cum tibiis et tarsis fuscocupreis.

♀ Long. 18–19, lat. 10 mm.

MINDANAO, Agusan River. (*W. Schultze* legit.)

Type ♀, No. 13687 in meiner Sammlung, Cotype ♂ in der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Vom richtigen Euchloren-Typus, oval, ziemlich stark gewölbt, gedrungen gebaut, lebhaft glänzend. Clipeus breiter als lang, die Seiten parallel, die Vorderecken leicht gerundet, der Rand kaum aufgebogen, die Fläche rotbraun, matt, dicht und fein runzelig punktirt. Stirnnaht sehr fein, leicht nach hinten geschwungen, Stirn dicht punktirt, matt, Scheitel zerstreuter punktirt, glänzend. Thorax von der gewöhnlichen Form, ohne Seitengrübchen aber mit feiner glatter Mittellinie, überall dicht und ziemlich kräftig punktirt, ringsum mit scharfer Randfurche, die nur von dem Schildchen unterbrochen ist. Scutellum zerstreut punktirt. Auf den Flügeldecken sind die primären Punktreihen regelmässig und hie und da furchenartig leicht vertieft, die Punkte wie auf dem Thorax ziemlich gross; ausserdem ist die ganze Oberfläche dicht mit ganz feinen Pünktchen übersät; der scharf abgesetzte Seitenrand reicht von der Schulter bis zum Hinterrand, wo hinter dem Spitzenbuckel die Sculptur grob höckerig wird; der häutige Randsaum ist breit. Das gelbe

Propygidium ist dicht punktirt, in jedem ein gelbes sehr kurzes Härchen; ausserdem nahe dem Hinterrand eine Querreihe langer gelber Borstenhaare. Das Pygidium ist fein erzgrün gesäumt, dicht mit unregelmässigen Augenpunkten bedeckt, ringsum mit einzelnen langen gelben Borstenhaaren. Bauchringe glänzend polirt mit verloschenen Augenpunkten und kurzen gelben Borsten. Brust zumal an den Seiten mit zusammenfliessenden groben Augenpunkten und feinen Runzeln, ziemlich spärlich graugelb behaart. Mittel- und Hinterschenkel am Vorderrand fein gerandet, Vorderschenkel mit einer scharfen Querfurche beim Hinterrand, aus der lange Borsten entspringen; Schienen und Tarsen ohne Besonderheiten; Fühler rötlich gelb.

Die eigentümlich olivengrüne (nicht grasgrüne) Färbung des Vorderkörpers mit glasig, zuweilen rötlich opalescirendem Glanz, das gelbe Pygidium und die glänzende kupfrige Unterseite, von der sich die hellgelben Schenkel scharf abheben, zeichnen diese Art von ihren Verwandten aus.

Anomala (Euchlora) maculifemorata sp. nov.

A. chloropygae affinis. Ovata, sat convexa, nitida, supra, saturate graminea, subtus viridiaenea, supra thoracis lateribus et maculis duabus ad pygidii latera, subtus maculis parvis ad segmentorum et coxarum latera, maculis ovalibus femorum et processuum coxarum posteriorum rufis.

♂ Long 16, lat. 9.5 mm.

LUZON. (*C. Semper* Coll.)

Aus der Verwandtschaft der *E. chloropyga* Burm., aber grösser, oben satt grasgrün, glänzend, Unterseite, Afterdecke, und Beine erzgrün, oben die Seiten des Thorax und 2 ovale Makeln auf dem Pygidium die sich an dessen Spitze beinahe berühren, aber nicht bis zu den Vorderecken reichen, unten scharf begrenzte Fleckchen an den Seiten der Sternite und Hinterhüften, ferner grössere ovale Makeln auf den Schenkeln nahe den Knieen sowie auf den mittleren Vorsprüngen der Hinterhüften rotgelb. Clipeus ziemlich lang, seine Seiten leicht convergirend, die Ecken schwach gerundet, der Rand ringsum fein aufgebogen und schwarz, die Fläche wie die Stirn dicht runzelig punktirt, nicht matt, die Stirnnaht fein erhaben, der Scheitel wie der Thorax und das Scutellum sehr dicht aber fein punktirt, der Thorax ziemlich lang mit rechtwinkligen Hinterecken und spitzen Vorderecken. Die Flügeldecken sind wie der Vorderkörper dicht und ziemlich fein punktirt; ausserdem sind auf der Scheibe die aus grösseren Punkten bestehenden primären Punktreihen vorhanden. Afterdecke dicht und fein runzelig, matt, dunkel-

grün mit scharf abgesetzten roten ovalen Flecken am Seitenrand, ganz zerstreut und spärlich grau behaart. Bauchringe dicht punktirt, an den Seiten gerunzelt, mit der gewöhnlichen Querreihe von Borstenpunkten und ausserdem schwachen Haarbüscheln an den Seiten; Brust wie die Bauchseiten sculptirt und ziemlich spärlich grau behaart. Beine ziemlich schlank, Fühlerkeule rotgelb mit dunklerer Geissel.

Anomala (Euchlora) seticrus sp. nov.

A. bicolor Fabr. et *denticrus* Ohs. proxime affines. Ovata, sat convexa, nitida, supra laete prasina, thoracis lateribus sat late, pygidii parte apicali majore laete flavis, subtus cum femoribus laete flava, leviter aenescens, tarsis et tibiarum apicibus et marginibus exterioribus viridiaeneis. Tibiae posticae saturate intus marginatae et setis nigris sat fortibus instructae.

♂ ♀ Long. 17–18, lat. 10 mm.

PALAWAN, Iwahig. (*C. H. Lamb* Coll.)

Type ♂, No. 13223 in meiner Sammlung, Type und Cotype ♀ ♀, No. 13223 in der Entomologischen Sammlung des Bureau of Science, Manila, P. I.

Zur Gruppe der *Euchlora bicolor* Fabr. gehörig und in dieser der *denticrus* Ohs. von Borneo nahe verwandt. Hell grasgrün, lebhaft glänzend, die Seiten des Thorax ziemlich breit hellgelb, nicht goldig. Die Ecken des Clipeus etwas stärker gerundet als gewöhnlich, der Vorderrand ein wenig höher aufgebogen als die Seiten, auch die Augen grösser als gewöhnlich. Halsschild ziemlich kurz, die Seiten in der Mitte verbreitert und nach vorn und hinten gleichmässig gerundet, die Vorderecken wenig vorgezogen; an Stelle der Seitengrübchen ein schwacher Höcker. Kopfschild und die vordere Hälfte der Stirn dicht und fein runzelig punktirt, ihre hintere Hälfte und der Scheitel, das Halsschild und Schildchen weitläufiger mit scharf eingestochenen feinen Punkten bedeckt, die Seiten des letzteren ziemlich breit punktfrei. Auf den Flügeldecken ist die ganze Oberfläche mit mikroskopisch feinen Pünktchen dicht bedeckt und ausserdem sind die aus grösseren Punkten bestehenden primären Punktreihen regelmässig ausgebildet, auf der Scheibe teilweise in seichten Furchen stehend; die Epipleuren sind ziemlich dick, glatt, und reichen bis zum Hinterrand. Das Propygidium ist hinten grün, vorn braun, dicht mit Augenpunkten bedeckt, deren jeder ein mikroskopisch kleines goldgelbes Härchen trägt (bei der *denticrus* sind diese Haare länger und silbergrau). Das Pygidium ist äusserst dicht mit zusammenfliessenden Augenpunkten und kleinen Höckerchen bedeckt, matt seidenartig

glänzend, ganz spärlich mit gelben Haaren bekleidet, die an der Basis und an den Seiten kurz, an der Spitze länger sind; an der Basis trägt es eine dreieckige kurze grasgrüne Makel, die nicht ganz bis zu den Vorderecken reicht und deren Spitze zugerundet ist; die grössere apicale Hälfte ist hellgelb. Die Unterseite und Schenkel sind hellgelb mit schwachen grünem Erzschiller, ebenso die Schienen, die nur an der Aussenseite und an den Kielen erzgrün sind. Bauchringe und Brust in der Mitte ganz spärlich mit verloschenen Augenpunkten, an den Seiten dicht runzelig punktirt und hier mässig dicht grauweiss, respectiv gelb behaart. Hinterschenkel und Hinterschienen verbreitert, die lezteren an der Innenseite mit scharf abgesetzter erzgrüner Kante die bei der basalen Stachelreihe ein Zähnchen und weiterhin eine Anzahl starker schwarzbrauner Stachelhaare trägt. Die Form des Forceps zeigt Fig. 1.

Anomala (Euchlora) nitidissima Blanchard.

Ehe ich an die Bearbeitung der Ruteliden der Philippinischen Inseln ging, bat ich Herrn P. Lesne, den Coleopterologen des Pariser Museums, mir typische Exemplare der von Blanchard aus den Philippinen beschriebenen Arten zur Ansicht zu schicken. Herr Lesne entsprach dieser Bitte in liebenswürdigster Weise; da aber, nach dem Reglement des Museums, Unica nicht verschickt werden dürfen, so schickte er mir von der *E. nitidissima*, deren Type ein Unicum ist, ein Exemplar, das neben der Type steckte und vielleicht von Blanchard selber später zu dieser Art gesteckt worden war. Auf eine weitere Nachfrage von meiner Seite äusserte Herr Lesne dann später selber Bedenken über die Zusammengehörigkeit der beiden Stücke zu einer Art und ich habe darum bei meinem Besuch im Pariser Museum im Juli 1911 Gelegenheit genommen, die Blanchard'sche Type genau zu untersuchen. Dabei konnte ich feststellen, dass das, was ich für *E. nitidissima* Blanch. gehalten und im Verzeichnis der Ruteliden der Philippinischen Inseln [3] aufführte, einer ganz anderen Art angehört, über die ich mich weiter unten äussern werde. Die Type der *E. nitidissima* Blanch. ist ein ♀, 16 mm. lang, 10 breit, auffällig flach gewölbt und breit, dunkel grasgrün, wie dick lackirt oder gerfirnisst erscheinend, zumal auf dem Pygidium, während die Unterseite dunkel erzgrün, in gewisser Beleuchtung kupfrig schillert. Das Kopfschild ist leicht trapez-

[3] *Phil. Journ. Sci., Sec. D* (1910), 5, 259, No. 34.

förmig, der Rand mässig hoch aufgebogen, die Oberfläche dunkelgrün mit kupfrigem Rand, der Randsaum schwarz, dicht und fein runzelig punktirt; ebenso ist die Stirn punktirt, auch neben den Augen stehen grobe Punkte, während der Scheitel fein und zerstreut punktirt ist. Der Thorax ist flach gewölbt, hinter der Mitte etwas erweitert, nach vorn stark verengt, die Vorderecken etwas vorgezogen, die Hinterecken stumpf und leicht gerundet, die ganze Oberfläche zerstreut und fein punktirt. Die Flügeldecken sind ganz fein und verloschen punktirt, ohne gröbere Punktreihen, nur neben den Epipleuren, die zumal neben den Schultern breit abgesetzt sind und bis zum Hinterrand reichen, ist die Sculpture dichter und kräftiger. Die Afterdecke ist hellgrün, die Sculptur ziemlich spärlich und fein, nur bei ganz bestimmter Beleuchtung, die Seiten etwas gelblich durchscheinend, die Oberfläche mit langen graugelben Haaren ziemlich reichlich besetzt. Seiten von Bauch und Brust ziemlich lang und dicht graugelb behaart, Schienen und Füsse satt erzgrün.

Nach dem Zustand der leicht gerunzelten Flügeldecken und des Abdomens ist die Type offenbar ein frisch entwickeltes, nicht ganz ausgefärbtes Stück. Ich besitze ein von J. Whitehead im März–April 1896, auf der Insel Negros gesammeltes ♀, das nach der teilweise abgeriebenen Behaarung zu schliessen schon längere Zeit im Freien gelebt hat und ganz ausgefärbt ist; bei diesem sind die Flügeldecken und die Afterdecke ebenso satt grasgrün wie der Vorderkörper, der Bauch und die Schenkel ebenso satt erzgrün wie die Schienen und Füsse. Sonst jedoch stimmt dieses Stück in allen wesentlichen Merkmalen mit der Type überein.

Die Art, die ich bisher für *E. nitidissima* Blanch. gehalten, ist neu und bedarf nun einer Beschreibung. Ich nenne sie nach den dachziegelartig angeordneten Höckerchen auf dem Pygidium.

Anomala (Euchlora) ceramopyga sp. nov.

Supra laete graminea, raro saturate graminea, nitidissima, thoracis lateribus plus minus anguste flavidis, subtus flavido-viridi-aenea cupreo splendore suffusa, tibiis tarsisque viridi-aeneis, pygidium aut flavidum viridiaenescens immaculatum, aut maculis parvis basalibus aut macula majore triangulari basali fuscoaeneo, aut totum fuscoaeneum lateribus pone apicem vix flavido pellucentibus; tota superficie subtiliter sat dense punctulata, pygidium lineis transversis tuberculorum teguliformium obtectum sparsissime hirsutum.

♂ ♀ Long. 18–21, lat. 10–13 mm.

LUZON, Manila (*Schadenberg, S.*); N. LUZON and S. LUZON, Albay (*J. Whitehead*); LUZON, Abra, Bangued (397, *C. S. Banks*); Occidental Negros, Bago (6019, *R. M. Araneta*).

Typen ♂ und ♀ in meiner Sammlung.

Oben hell grasgrün, selten dunkler grasgrün, lebhaft glänzend wie gefirnisst, die Seiten des Halsschildes rotgelb durchscheinend, die Unterseite gelb mit lebhaftem grünem und kupfrigem Erzschimmer, die Schienen und Füsse rein erzgrün, die Afterdecke entweder rein gelblich mit grünem Erzschimmer, oder mit 3 kleinen dunklen Flecken an der Basis oder mit einer grösseren dreieckigen dunkelgrünen Makel, deren Spitze nach dem After gerichtet ist, oder schliesslich ist die ganze Afterdecke dunkel erzgrün und nur die Seiten bei der Spitze scheinen bei bestimmter Beleuchtung gelblich durch. Das Kopfschild ist fein goldig gerandet, der niedrig aufgebogene Rand schwarz. Die ganze Oberseite ist fein und dicht punktirt, auf den Flügeldecken sind nur neben der Naht und auf der Scheibe Reihen grösserer Punkte (die primären Punktreihen) erkennbar, die Nahtrippe zumeist punktfrei, die Epipleuren scharf abgesetzt, in der Schulter. Spitzenbuckellinie zumeist eine Reihe kurzer Querfältchen. Die Afterdecke ist mit Querreihen feiner Höckerchen bedeckt, die dachziegelartig angeordnet sind; nur am Seitenrand und nahe der Spitze stehen vereinzelte lange gelbe Borsten, die Mitte zeigt gewöhnlich eine feine Längsfurche. Die Bauchringe sind, abgesehen von der Querreihe borstentragender Punkte, in der Mitte ganz spärlich, an den Seiten etwas dichter mit unvollständigen Augenpunkten, die Hinterhüften und Brust dagegen dicht mit solchen bedeckt, die letztere dicht aber ziemlich kurz graugelb behaart. Die Form des Forceps zeigt Fig. 2; die Parameren sind ziemlich lang, schnabelförmig gekrümmt, der Fortsatz der Ventralplatte des Mittelstückes ist lang und breit, bis zur Spitze der Parameren reichend, am Vorderrand ausgebuchtet, leicht löffelartig vertieft, mit einem zahnartigen Vorsprung auf der Unterseite nahe der Basis der Parameren.

Anomala (Euchlora) prasina Burm.

Am Schluss seiner Beschreibung dieser Art sagt Burmeister,[4] er zweifle kaum, dass diese seine Art identisch sei mit der *E. sieboldii* Hope, und nachdem ich die Type der *E. prasina* im Hallenser Museum untersucht habe, kann ich diese Vermutung Bur-

[4] Handb. d. Entom. (1844), 4, Pt. I, 277.

meister's nur bestätigen. Das eine der beiden Stücke im Hallenser Museum ist ziemlich klein, 18.5 mm. lang und nur 11 mm. breit, also relativ schlank, das Pygidium auffallend dicht und ziemlich grob sculptirt, lebhaft erzgrün, die Seiten kaum gelbrot durchscheinend. Aber in allen wesentlichen Merkmalen, vor Allem in der sehr auffälligen Form des Forceps, stimmt sie mit der *sieboldii* Hope überein. Ob die Art wirklich auf den philippinischen Inseln vorkommt, möchte ich bezweifeln; ich habe sie mit dieser Fundortsangabe bisher nur in 2 Exemplaren erhalten, das eine aus einer alten französischen Sammlung mit der Etikette "*Euchlora* n. sp. MANILA," das andere mit der Etikette "IS. PHILIPP." aus der Sammlung des verstorbenen Dr. Richter-Pankow, die viele Stücke mit falschen Fundortsangaben enthielt. Häufig ist die Art auf Süd Celebes, Macassar; Bua-Kraeng 3000 f., Feb., 1896, Samanga, Nov., 1895, Lompa-Battau 3000 f., März, 1896 (*H. Fruhstorfer S.*); Bantimurang (*C. Ribbe S.*); Bonthain 5–7000 f., Okt., 1895 (*A. Everett S.*), sowie auf Gross-Banda (*Staudinger*). Die mir vorliegenden Stücke von Bantimurang sind relativ klein, mit fast einfarbig gelbgrünem Pygidium, wodurch sie der *E. ceramopyga* m. sehr ähnlich werden. Allein die Sculptur der Flügeldecken, die noch gröbere Sculptur des Pygidiums und vor Allem die Form des Forceps (Fig. 3) unterscheiden sie sicher von dieser Art.

Anomala (Euchlora) smaragdina Eschsch.

Im Kgl. Zoolog. Museum in Berlin befinden sich Stücke dieser Art, die das Museum von Eschscholtz selber erhielt und die darum als typisch betrachtet werden dürfen. Ihre Oberseite ist hell grasgrün, äusserst glänzend, wie lackirt, der Clipeus und das Scutellum an der Spitze fein goldig gerandet, die Seiten des Thorax breiter goldrot durchscheinend. Das Pygidium ist hell erzgrün, an den Seiten eine längliche rotgelbe Makel, die erzgrüne Partie, zumal an der Basis und Mitte, äusserst glänzend polirt, mit ganz wenigen verloschenen Punkten, die Seitenpartieen und Spitze dicht nadelrissig und fein höckerig. Die Unterseite ist hell erzgrün respectiv messingfarben mit kupfrigen Reflexen, die Schienen und Tarsen satt erzgrün. Die Form des Forceps zeigt Fig. 4.

Anomala (Euchlora) trigonopyga sp. nov.

Statura *E. smaragdinae*, plerumque major, laete prasina nitidissima, clipeo et scutello anguste auro-marginatis, thoracis latera late flavo et rufo-aureo marginata, pygidium rufum macula

chen und neben der Schulter ist schwarzbraun. Die primären Rippen auf den Deckflügeln sind gut gewölbt und die Punkte der sie begrenzenden primären Punktreihen sind ringförmig, stets ohne Haare oder Borsten, während die Punkte, aus denen die ziemlich kurzen gelben Haare entspringen, sehr klein und einfach sind. Die Sculptur im Interstitium primum oder subsuturale, im Raum zwischen der Nahtrippe und zweiten primären Rippe, die in der Zwischennaht und Schulterspitzenbuckel verläuft, ist in dem queren Eindruck hinter dem Scutellum und im basalen Abschnitt davor undeutlich; hinter diesem finden sich darin zwei deutliche secundäre Rippen und zwischen diesen eine undeutliche schmale tertiäre. Die zweite und dritte primäre Rippe (die letztere innen neben der Schulter) tragen vereinzelte einfache feine Pünktchen. Die innere (grössere) Klaue an den Vorderfüssen ist gleichmässig dick und lang, an der Spitze gerade quer abgestutzt, an der oberen Kante eingeschnitten, mit einem feinen Zähnchen. Die Form des Forceps zeigt Fig. 9. Die Afterdecke ist gleichmässig dicht graugelb behaart.

Pseudomalaia tagala Heller.

Diese Art ist der *pilifera* Burm. sehr nahe verwandt, unterscheidet sich aber in folgenden Punkten. Die Färbung der Deckflügel ist entweder rein schwarzbraun (zuweilen mit bläulichem Schiller) oder, wenn rotbraune Flecken auftreten, erreichen sie nur am Hinterrand den Rand, die Naht, Basis, und der Seitenrand bleiben immer dunkel. Die primären Rippen sind stets punktfrei und die Behaarung der Deckflügel ist spärlicher. Die tertiäre Rippe zwischen den beiden secundären im Interstitium subsuturale ist bis nahe an die Basis deutlich ausgeprägt. Am Forceps, Fig. 8, sind die Parameren vor der Spitze deutlich eingeschnürt, die Spitze schärfer winklig abgesetzt, was besonders bei der Betrachtung von der Unterseite deutlich hervortritt. Die eigentümliche löffelartige Verlängerung der Ventralplatte des Mittelstückes am Forceps, die der *pilifera* und *tagala*[3] gemeinsam ist, kommt, auf der Abbildung des Forceps der *P. tagala* Heller in der *Deutschen Ent. Zeitsch.* (1891), Taf. III, fig. 17, nicht zur Darstellung; vielleicht ist sie bei der Präparation abgebrochen.

Es liegt mir aus der Gattung *Pseudomalaia* noch eine neue Art vor, deren Beschreibung ich weiter unten folgen lasse. Die

[3] Herr Prof. Heller hat ein zweites typisches Exemplar seiner Art auf dieses Merkmal hin untersucht und sein Vorhandensein festgestellt.

bis jetzt bekannten 5 Arten der Gattung lassen sich nach dem folgenden Schema unterscheiden:

Die Nahtrippe ist ganz punktfrei oder höchstens nahe der Spitze mit einigen kleinen Pünktchen ..... 1.
Die Nahtrippe ist überall fein punktirt und behaart..... 5.

1. Die Deckflügel sind gelbbraun ohne dunkle Umrandung, *immer gänzlich unbehaart;* im Interstitium subsuturale 2 secundäre Rippen, getrennt im ganzen Verlauf durch eine einfache Reihe von Augenpunkten ..... semperi Kraatz.
2. Deckflügel glänzend braunschwarz mit einer kleinen, scharf begrenzten schiefen braungelben Makel, *die Behaarung ganz spärlich,* fast nur auf den Eindruck hinter dem Schildchen beschränkt; im Interstitium subsuturale zwischen den beiden secundären Rippen eine regelmässige tertiäre, die nur bei der Basis verloschen ist. Am Forceps die Ventralplatte des Mittelstückes in eine lange, nach abwärts gekrümmte Spitze ausgezogen ..... whiteheadi sp. nov.
3. Deckflügel rein braunschwarz oder mit einer gelbbraunen Makel, die den Hinterrand erreicht, die Behaarung reichlicher, über die ganzen Deckflügel verbreitet; das Interstitium subsuturale im basalen Teil und in dem starken Eindruck hinter dem Schildchen so unregelmässig, dass hierdurch auch die innere secundäre Rippe ganz, die äussere zum Teil, verschwinden; nur im apicalen Teil sieht man auf eine kurze Strecke zwischen den beiden secundären Rippen eine schmale tertiäre; am Forceps die Ventralplatte des Mittelstückes oval, löffelartig ausgehölt, die Spitze zugerundet, kurz umgebogen, die Parameren vor der Spitze eingeschnürt ..... tagala Heller.
4. Deckflügel hell braungelb, beim ♂ nur der Rand an der Basis neben Schulter und Schildchen fein schwarzbraun gesäumt (was beim ♀ fehlen kann?); im Interstitium subsuturale 2 secundäre Rippen, zwischen denen nur im apicalen Teil noch Reste einer schmalen tertiären sichtbar sind. Am Forceps ist die Ventralplatte des Mittelstückes wie bei der *tagala,* die Parameren jedoch sind nicht eingeschnürt, ihre Spitze ist breiter abgestutzt; die Nahtrippe an der Sptize, die zweite und dritte secundäre Rippe im ganzen Verlauf mit vereinzelten feinen Haarpünktchen ..... pilifera Burm.
5. Die ganze Oberfläche ist überall mit feinen Haarpunkten bedeckt, die Haare länger als bei den anderen Arten; nur die primären Rippen noch regelmässig convex, die secundären in den Interstitien durch die dichte Punktirung mehr oder weniger verloschen. Flügeldecken hell braungelb mit schmaler schwarzbrauner Umrandung. Am Forceps die Ventralplatte des Mittelstückes in 2 seitliche Spitzen ausgezogen (fig. 10) ..... flavopilosa Ohaus.

Pseudomalaia pilifera Burm., *P. tagala* Hell. und *P. whiteheadi* sp. nov. haben gemeinsam die Form und Farbe des Körpers, beim ♂ die Form der inneren Klaue an den Vorderfüssen, die nahezu gleichbreit, an der Spitze quer abgestutzt und an der oberen Kante fein eingeschnitten ist, sowie der äusseren Klaue an den Mittelfüssen, die an der Spitze nur äusserst fein, kaum sichtbar eingeschnitten ist. Sie unterscheiden sich durch Farbe,

Behaarung, und Sculptur der Deckflügel, sowie die Form des Forceps. Bei der *P. semperi* ist die innere Klaue der Vorderfüsse kurz, in der Mitte stark verbreitert, vorn schief abgestutzt mit längerem Zähnchen an der oberen Kante, die äussere Klaue der Mittelfüsse kaum sichtbar eingekerbt. Bei der *P. flavopilosa* ist die innere Klaue der Vorderfüsse ziemlich schmal, in der Mitte kaum verbreitert, vorn schief abgeschnitten und tief gespalten, die äussere Klaue an den Mittelfüssen tiefer gespalten als bei allen anderen Arten.

Fig. 6 zeigt die Form des Forceps bei *P. semperi* Fig. 10, die der *P. flavopilosa*.

Pseudomalaia whiteheadi sp. nov.

Magnitude et statura *P. piliferae* Burm. et *tagalae* Hell., fusco-brunneus, parum nitidus, capite, thorace et scutello, pygidio et pedibus leviter viridiaeneis tarsis nigris; corpus supra et subtus cum pedibus sat dense, elytra in disco solum sparsissime flavo pilosa, elytra nigra macula flavobrunnea oblique discali ornata.

♂ ♀ Long. 7.5, lat. 4–4.5 mm. NORD LUZON (*J. Whitehead*, S.).

Dunkelbraun mit leichtem grünem Erzglanz, wenig glänzend, oben und unten ziemlich dicht graugelb behaart, die Deckflügel glänzend schwarz mit einer ziemlich scharf begrenzten rotgelben schiefen Makel auf der Scheibe. Kopfschild trapezförmig, braun, der Rand fein aufgebogen, dicht und ziemlich fein gerunzelt. Kopf mit feineren, Halsschild mit gröberen Bogenstrichen, beide nur hinten, am Hinterhaupt respectiv vor dem Schildchen mit einzelnen Punkten; dieses letztere dicht punktirt und behaart mit einer kahlen, glatten Schwiele in der Mitte der Basis. Deckflügel mit breitem und tiefem Quereindruck hinter dem Schildchen und je einem kleineren innen und aussen neben den stark vorspringenden Schultern, alle primären Rippen regelmässig gewölbt, glatt und kahl, begrenzt von regelmässigen Reihen von Augenpunkten, in allen Interstitien je 2 secundären Rippen, im subsuturalen zwischen den beiden secundären eine tertiäre Rippe, die nur an der Basis undeutlich ist; nur bei dem Quereindruck einige kurze gelbe Härchen, die aus kleinen Pünktchen, nicht aus den Augenpunkten, entspringen. Propygidium und Pygidium, Unterseite und Beine dicht und ziemlich fein getrichelt. Die Form des Forceps zeigt Fig. 7.

Andoretus luridus Blanchard.

Die Type dieser Art, die ich im Sommer 1911 im Pariser Museum untersuchen konnte, ist ein grosses ♀ von heller Färbung ohne dunkle Thoraxmakel und ziemlich reichlicher Behaarung,

eine Form, die auch unter den ♀ ♀ seltener ist als die zumeist dunkleren Stücke mit schwarzbraunem Thorax und spärlicher Behaarung. Die ♀ ♀ sind fast immer grösser als die ♂ ♂ und ziemlich konstant in der Grösse, während die ♂ ♂ darin ziemlich variabel sind; die mir vorliegenden ♂ ♂, die ich aus einem ziemlich grossen Material ausgesucht habe, schwanken von 7–10, die ♀ ♀ nur von 10–10.5 mm.

A. philippinicus Pic dessen Type ich, dank der Liebenswürdigkeit des Autors, untersuchen konnte, ist nur ein kleines, dunkles ♂ von *A. luridus* Blanch., und muss daher als Synonym zu dieser Art gesetzt werden.

Die Art, die ich bisher nach der etwas kurzen und nicht ganz korrekten Beschreibung für die Pic'sche Art hielt, benenne ich *A. semperi*, weil ich sie schon früher unter diesem Namen in den Sammlungen bestimmt habe.

Adoretus semperi sp. nov.

Ex. affinitate *A. assimilis* Hope (*testaceus* Hope et *cribrati* White), minor, rufo testaceus pedibus antennisque flavis, sat dense ac breviter griseo-pubescens, elytra pilis longis albis singulis ornata.

♂ Long. 7–9, lat. 3.5–4.5; ♀ long. 8–10, lat. 4–4.5 mm.

LUZON (*C. Semper* Coll.); S. Luzon, Albay und Mittel Luzon (*J. Whitehead* Coll.).

In die Gruppe des *A. assimilis* und *cribratus* gehörend, in welcher auf den anliegend grau behaarten Deckflügeln sich einzelne lange Borsten erheben. Parallelseitig, flach gewölbt, rötlich scherbengelb, wenig glänzend, die Beine und Fühler hellgelb, der ganze Körper anliegend mässig dicht und kurz grau behaart, die Beine mehr abstehend gelb behaart, auf den Deckflügeln vereinzelte aufrechte weisse Borsten. Der Kopf und die Augen sind sehr gross, das Kopfschild fast halbkreisförmig, der Rand deutlich aufgebogen, schwarz, die Fläche wie die Stirn dicht runzelig, der Scheitel etwas weitläufiger punktirt, jeder Punkt mit einem Härchen. Die Oberlippe ist rötlich, das Rostrum schwarz, lang, sein Rand gekerbt, seine Mitte gekielt. Der Thorax ist in der Mitte nicht länger als Stirn und Scheitel, wie der letztere, punktirt und behaart; ebenso das Schildchen. Auch die Deckflügel sind überall dicht, an den Seiten runzelig punktirt; die primären Rippen sind zumeist, wenigstens auf der Scheibe, deutlich erhaben; die vereinzelten Borsten entspringen aus Punkten der primären Punktreihen. Die Behaarung der Afterdecke ist nahe der Spitze etwas länger und abstehend, nicht so auf der Brust. Die Beine sind kräftig,

die Vorderschienen in beiden Geschlechtern 3-zähnig, die Tarsen und Klauen lang, die Fühler 10-gliedrig, die Keule beim ♂ etwas länger als beim ♀.

Adoretus umbrosus Fabricius.

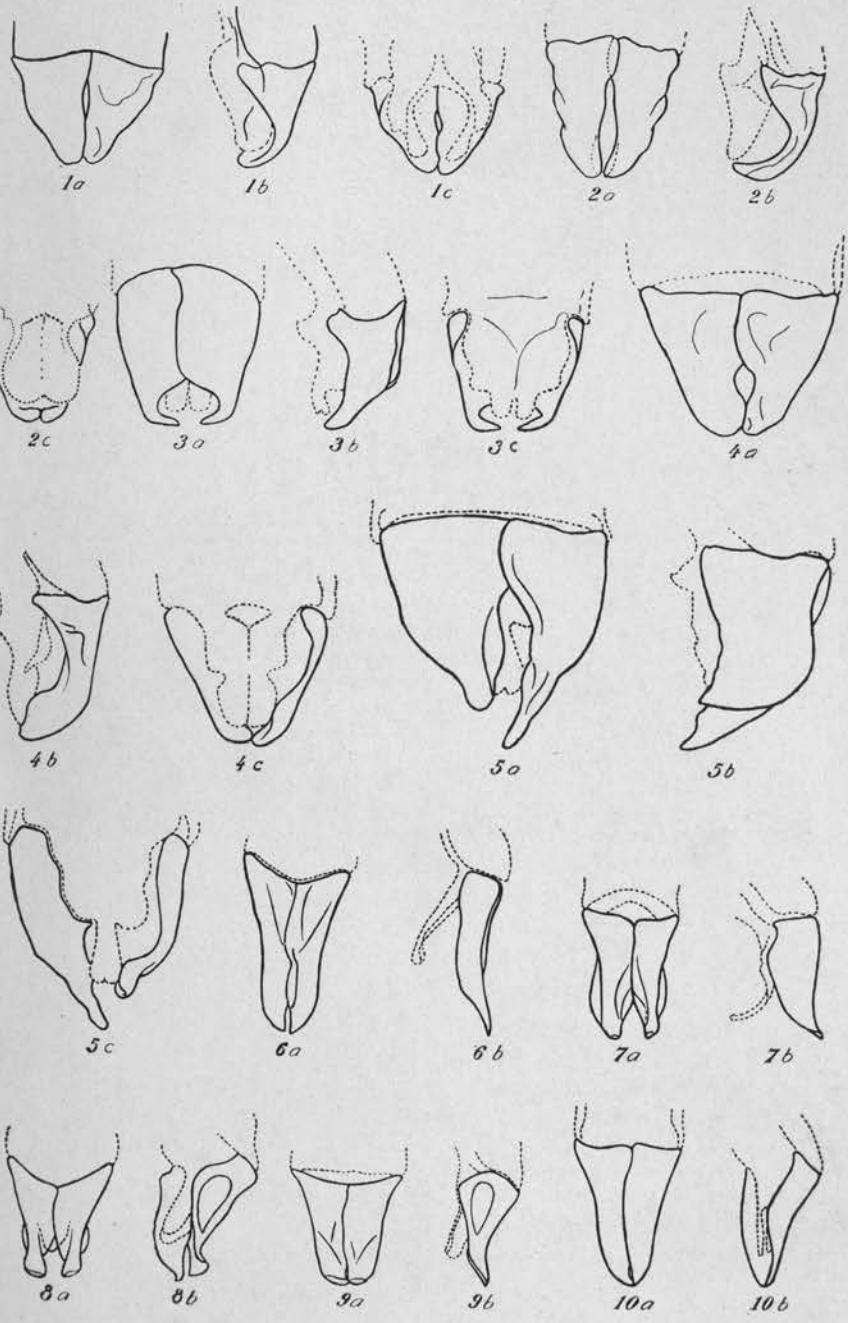
Diese Art, deren Type aus dem Kopenhagener Museum ich untersuchen konnte, stammt von Senegal und ist später von Castelnau als *hirtellus* und von Burmeister als *cinerarius* nochmals beschrieben worden. Die Art dagegen, die in den meisten Sammlungen und Verzeichnissen als *A. umbrosus* figurirt, muss den Namen *A. compressus* Weber führen. Die Weber'sche Type, die von Sumatra stammt, habe ich leider nicht ausfindig machen können, dagegen habe ich die Type des *A. compressus* Wiedemann aus Java in Händen gehabt, der sehr wahrscheinlich seine Art nach Kenntnis der Weber'schen Stücke beschrieben hat. Der *A. compressus* Weber respectiv Wiedemann, ist weit verbreitet. Ich besitze Stücke vom Kapland (*Drege*); Ile-de-France; S. Ceylon (*H. Fruhstorfer*), Mai, 1889; Madras; Cambodja; Singapur (*Atkinson*); Sumatra; Delhi; Java, Batavia; Borneo, Limbang, Niabang, Sarawak, Kuching, Barran Fluss, Kina-Balu, Tandjong-Banjermasin; Luzon (*J. Whitehead*); Celebes, Samanza (*H. Fruhstorfer*); Gilolo; Hawai, Honolulu. Wahrscheinlich ist der Käfer mit Kulturpflanzen, die nur durch Stecklinge vermehrt werden (Bananen, Zuckerrohr), verschleppt worden, wie wir dies von einer ganz nahe verwandten Art, dem *A. tenuimaculatus* Waterh. bestimmt wissen.

TAFEL I.

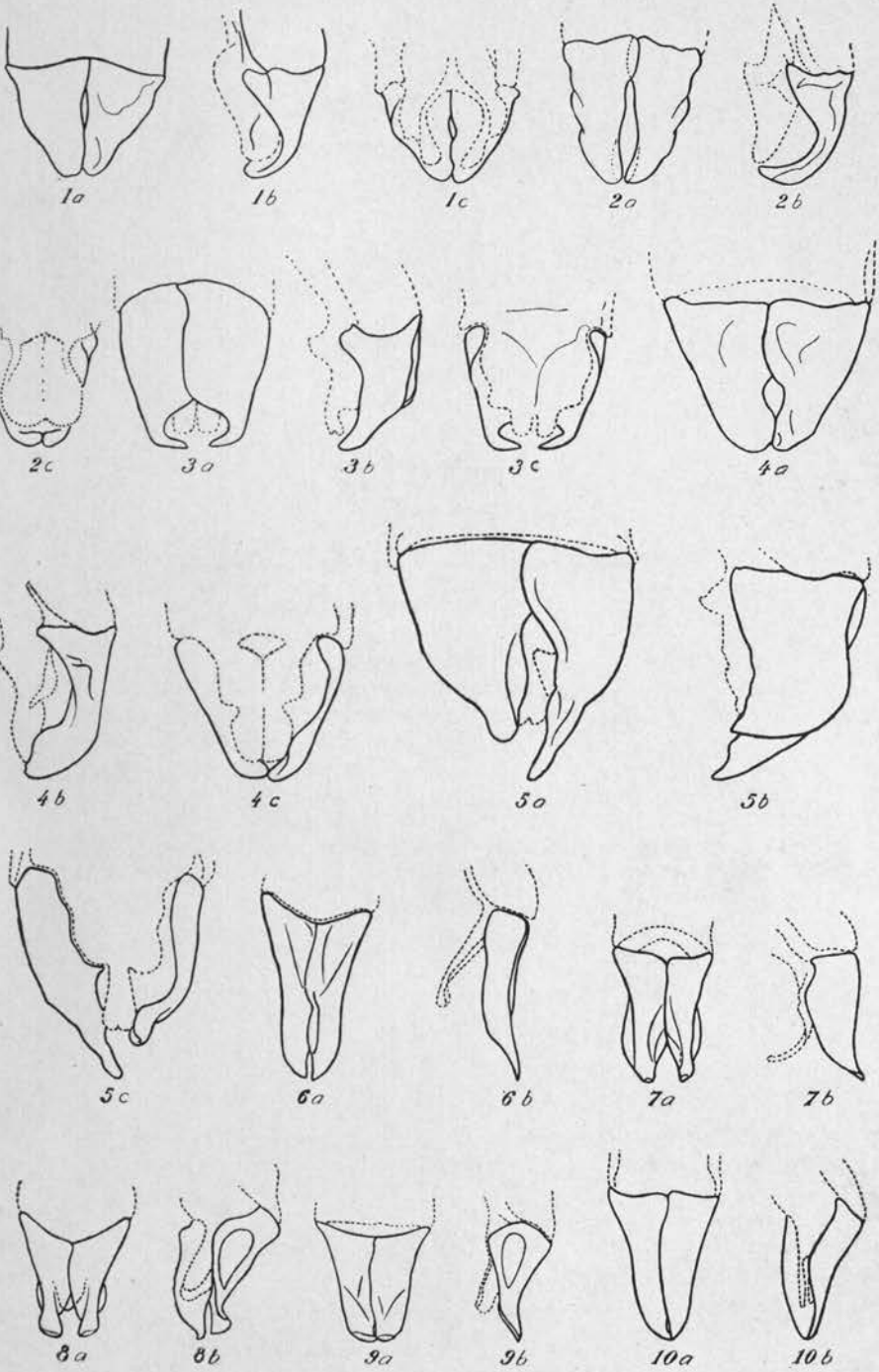
a, visus dorsalis; *b*, visus lateralis; *c*, visus ventralis.

FIG. 1. *Anomala* (*Euchlora*) *seticrus* Ohaus.
2. *Anomala* (*Euchlora*) *ceramopyga* Ohaus.
3. *Anomala* (*Euchlora*) *prasina* Burm.
4. *Anomala* (*Euchlora*) *smaragdina* Eschsch.
5. *Anomala* (*Euchlora*) *trigonopyga* Ohaus.
6. *Pseudomalaia semperi* Krtz.
7. *Pseudomalaia whiteheadi* Ohaus.
8. *Pseudomalaia tagala* Heller.
9. *Pseudomalaia pilifera* Burm.
10. *Pseudomalaia flavopilosa* Ohaus.

Die Ventralplatte des Mittelstückes des Forceps ist stets..... gezeichnet.



TAFEL I. CHARACTERE DES PYGIDIUMS DER RUTELIDEN.



TAFEL I. CHARACTERE DES PYGIDIUMS DER RUTELIDEN.

THE PHILIPPINE JOURNAL OF SCIENCE,
D. General Biology, Ethnology and Anthropology.
Vol. VII, No. 4, 1912.

NOTES ON PHILIPPINE EDIBLE MOLLUSKS.

By ALVIN SEALE.

(From the Ichthyological Section, Biological Laboratory, Bureau of Science, Manila, P. I.)

Mollusks [1] are daily sold in Manila markets, and no one seems to be able to give any definite information about them. Filipinos, especially of the laboring class, depend largely upon these shell fish for their daily food, and it is obviously important that we should make a careful study of the most important mollusks, in order that we may devise means of cultivating and continuing the supply, and especially there should be careful supervision of oyster beds, in order that they may be free from contamination.

The mollusks treated of in this paper are merely the common forms that are constantly used as food by the Filipinos. Any species listed may be purchased in the Manila markets at almost any time. A detailed list of all the mollusks used for food in the Philippines would include practically every species known to occur here.

OYSTERS.

Three species of edible oysters are found in the Philippines. These are *Ostrea orientalis* Ch., *O. palmipes* Saub., and *O. pyxidata* Reeve. All are known as *talaban* in Tagalog and *timer* in Ilocano. They form an important food supply in the Philippines, being found in almost all the islands. Near Manila large oyster beds occur on the tide flats at Malabon; and, in fact, almost all the *esteros* of Manila Bay have their quota of oysters.

[1] I do not claim to be a conchologist, and the identifications in this paper are the results of comparing specimens with identified species in the Quadras collection, and an examination of such literature as was available. Doubtless there are mistakes.

Large oyster beds are found along the south side of Manila Bay, where the cultivation of the mollusks receives considerable attention from the Filipinos. Almost all these beds are staked off as private claims, and a watchman is employed by the owners to prevent any serious thieving. In these beds small branches of bamboo are stuck in the mud as spat collectors. It is probable that these privately-controlled oyster beds have prevented the complete destruction of the Manila oyster industry by preserving the oysters until they are large enough to spawn. There is no law in force limiting the gathering of oysters.

The oysters found in the cultivated beds reach a length of from 12 to 14 centimeters, while shells 18 centimeters in length are not uncommon. Oyster beds of considerable extent and containing unusually well-flavored oysters are found in several localities in Palawan, especially in Malampaya Sound. No chart or survey of any kind has ever been made of the Philippine oyster beds except a preliminary inspection by the writer during the past year. They are well worth a thorough investigation, and no doubt the output could be greatly increased by proper cultural methods. An adaptation of the methods employed on the oyster farms at Arcachon, France,[2] could be inaugurated easily, especially in the oyster beds of Manila Bay.

The Manila Bay oyster is looked upon with considerable suspicion by the American population of this city, but, if fresh oysters are selected from the beds at a distance from the city and properly *cooked,* there is no reason why they should not be used as food.

In Manila markets, oysters sell for from 20 to 50 centavos[3] per liter, very small ones can be bought for 1 centavo per dozen. It is estimated that about 50 liters are sold each day. The method of handling oysters in the local markets is to be deplored, and should speedily be remedied. They are usually brought to the market husked, placed on or in a tin box where the proposed buyers run their fingers over them. The seller also frequently dips in an unclean hand and gives them a generous mixing. There is no doubt that oysters are taken from certain of the *esteros* quite near the city, especially one draining the district of Tondo where there is every possibility of their being infected by sewage. The gathering and sale of such oysters in the market should be prohibited.

[2] Hornell, *Madras Fisheries Bull.* (1910), 1, 1 to 90, pls.

[3] One peso (100 centavos) Philippine currency equals 50 cents United States currency.

The shell of the oyster is used in some parts of Luzon for the manufacture of lime, the price paid being 2 pesos per cubic meter. At Malabon there are piles of old shells of fully 100 cubic meters, which will serve to indicate the extent of the oyster industry at that place.

SURF CLAMS.

The *calumismis, Tapes striatus* Chem. (Plate I, fig. 4), is easily distinguished by the narrow black lines which form reticulations on the sides and straight lines on the margins. It measures about 7 centimeters across the widest diameter. It is found buried in the sand along the beach in shallow water, apparently much scattered, not growing in regular beds. These clams sell for from 7 to 12 centavos per dozen in the market. They are usually secured in the greatest numbers during October.

HARD SHELL CLAMS.

There are at least two species of clams included under the names *halaan, patayog,* and *cabia.* One, *Tapes literata* Linn. (Plate I, fig. 2), is brownish pink to white, with about three broad, radiating, white stripes from the back to the margin of the shell; these stripes have dark margins. This is by far the most abundant mollusk to be found in the Manila market, and can be secured at any time. In size it is about 6 centimeters across the greatest diameter. The clams are secured chiefly on the Pasay beach near Manila, usually at low tide. After a heavy storm, thousands are washed ashore and the beds are greatly damaged. They sell in the market for 40 centavos per hundred. They make excellent soup. Another clam, also called *halaan, Tapes virginæ* Linn. (Plate I, fig. 3), is in shape and general appearance much like the above, except that the stripes radiating from the beak to the margin of the shell are black or purple. This is a finely flavored clam, and commands the same price in the market as *T. literata* Linn.

SAND CLAM.

The *saropsarop* or *daroparpar, Circe undatina* Linn. (Plate I, fig. 5), is not so abundant as the *halaan.* It is also of less width between the valves; its longest diameter is about 6 centimeters. It is yellowish white with black lines across the hinge margin and above the beak. It is a good, clean food and sells in the market for 10 centavos per kilogram. It is found in salt water on practically all sandy beaches of the Philippines.

PHILIPPINE LITTLE-NECK CLAM.

The *lucan, Cyrena suborbicularis* Phil. (Plate I, fig. 6), next to the *halaan,* is perhaps the most important species in the Philippines. It forms a large percentage of the food of the poorer people of Manila. The *lucan* is quite abundant in most of the mud flats and *esteros* throughout the Islands, being a brackish-water species that burrows in the mud. In color it is uniform dark greenish; the epidermis is roughened or velvety to the touch. This species is the largest of the clams commonly sold in the markets, being from 6 to 9 centimeters across its greatest diameter. It sells for 6 centavos per kilogram. The *lucan* is wholesome, when fresh, and makes an excellent chowder.

SMALL GREEN CLAM.

The *tulla, Psammobia togata* Slesh. (Plate II, fig. 1), is found in abundance by sifting the black sand of the river mouths; it seems to extend into the fresh water. The shell is green, and about 3 centimeters in greatest diameter. This clam is excellent for soup. It sells for 7 centavos per kilogram in the Manila markets.

RIDGED SAND CLAM.

The *camotpusa, Circe gibbea* Lk. (Plate II, fig. 2), is a rather small clam, usually measuring about 5 to 6 centimeters across its widest diameter. It is characterized by the strong ridges on the posterior half of the shell. These ridges gradually diminish in size posteriorly. The color is white with about 3 angular black bands crossing the hinge. This clam is abundant about Manila on sandy beaches which are exposed at low tide. It has a fine flavor. The market price is 6 centavos per kilogram.

ROCK CLAM.

The *bototoy, Cardium dule* Linn. (Plate II, fig. 3), is a small clam usually about 5 centimeters across its greatest diameter; the width between the valves is about 5 centimeters. The shell is strongly and uniformly ridged, with the greenish fuzz of the epidermis filling the space between each ridge except on the beak, where it is usually worn off, thus exposing the white shell. This clam is found on reefs or among rocks in shallow water. It is regarded as a good food, and sells for 7 centavos per kilogram. It is very unusual, however, to see it offered for sale in any large quantity.

"BUTIL."

The *butil, Cryptogramma squamosa* Linn. (Plate II, fig. 4), is a clam 2 to 3 centimeters in its greatest diameter, found in the salt water on sandy beaches, throughout the Islands. The strongly-ribbed shell is white and brown. This small clam is a common article of food for the natives living near the sea. It sells for 3 centavos per hundred and makes excellent soup.

VENUS CLAM.

The *kanturi, Cardium donaciforme* Speng. (Plate II, fig. 6), is a white clam about 4 centimeters in length, common on sandy, salt-water beaches. It is of little value, and sells for 3 centavos per hundred.

MINUTE SAND CLAM.

The *alamis, Dorax radians* Lk. (Plate II, fig. 5), is a white or bluish clam, measuring about 3 centimeters across its greatest diameter. It is very abundant on sandy beaches in shallow salt water. It sells for 5 centavos per kilogram in the local markets.

WAVED VENUS CLAM.

The *morans, Venus alta* Saw. (Plate II, fig. 7), is a small clam, and is not found in sufficient quantities to be of much importance. It is interesting because of the curious sculpturing of its shell which resembles a minute model of the terraces on the hills of Japan or in the Igorot country of the Philippines.

DUCK-BILL CLAM.

The *lutos, Anatina truncata* Linn. (Plate I, fig. 9), is found in abundance in the sand and mud of the shallow water of Manila Bay. It is easily distinguished by the long thick "neck" protruding from the posterior portion of the shell. The color is uniformly white; the shell is very thin, and ranges in size up to 8 centimeters or more. It is regarded as a good food and sells for about 10 centavos per kilogram in the local markets.

SUNSET AND TELLEN SHELLS.

Paros. (Plate II, fig. 9.) There are about 14 species of the genus *Tellina* found in the Philippines, all of which are used as food. They are found on sandy or muddy shores, in the *esteros* or near the entrances to streams. They are usually beautiful shells, being a delicate purple with radiating stripes extending

from the beak to the margin of the shell. The usual size of our most abundant species is about 6 to 8 centimeters. Six species, *T. pellucida* Phil., *T. perplexa* Hem., *T. incerta* Desh., *T. capsoides* Lam., and *T. timorensis* Lam., are to be found in the local markets; they sell for 15 centavos per kilogram and make very good soup. The young are sometimes called *paros-parosan.* The *paros, Capsella elongata* Linn. (Plate II, fig. 8), is very similar to the above.

MUSSELS.

Tehong. There are about a dozen different species of mussels, family Mytilidæ, in the Philippines, representing at least three genera—*Mytilus,* the edible mussel; *Modiola,* the horse mussel; and *Lithodomus,* the rock-eaters. All are used as food in these Islands; perhaps the most abundant species is *Modiola matealfei* Hare. (Plate I, fig. 10.) They are found in the salt water usually attached to stones or piles. They are bluish or greenish, and from 4 to 13 centimeters in length. Their price in the local market is about 8 centavos per kilogram.

RAZOR CLAMS. FAMILY SOLENIDÆ.

There are three varieties of razor clams (*tikhan*) found in the Philippines. These are *Solenocurtus acurtidens* Brod. et Low., *Solen grandis* Dkr., and *Solen gracilis* Phil. (Plate II, fig. 10). The last-named species is the most abundant, being found on sandy or muddy beaches at very shallow depths. The shells are pale green, and measure about 7 to 8 centimeters in length by 1.5 centimeters in width. All are used as food and sell for 10 centavos per kilogram in the markets.

FRESH-WATER MUSSEL.

The *sulib, Anodonta tenius* Lea (Plate I, fig. 8), is common in the Pasig River. The shell is greenish brown, smooth, and about 8 to 10 centimeters in length. The inside is a beautiful mother-of-pearl color; however, the shell is too thin for the manufacture of buttons, and I have never known of a pearl being found in one of them. They are highly regarded as food by the native inhabitants, and sell in the local market for 6 centavos per kilogram.

"BALAY." TONGUE CLAM.

These strangely-shaped shells, *Lingula anatina* Linn. (Plate I, fig. 11), are found in great abundance on Pasay beach, especially after a heavy storm, when they are secured by thou-

sands. They are used as food, but care should be exercised to get them perfectly fresh, as otherwise they are apt to produce gastric trouble. They sell in the local market for 6 centavos per hundred.

HORN SHELL.

The *bangongon, Telescopium telescopium* Linn. (Plate II, fig. 12), is a large, dark brown, cone-shaped shell, found in Manila Bay in salt or brackish water; usually on a mud bottom in shallow water. It is regarded as good food by the natives and frequently sold in the local market. There are at least 25 species of this family (Cerittindæ) found in the Philippines. Most of the individuals are very small. All are used as food. One species called *suso, Potomides sulcatus* Born (Plate II, fig. 13), is often sold in the local market at 5 centavos per kilogram. It is found in brackish water on a mud bottom. Perhaps the most abundant species is one called *susong-puti* or *bayongon, Cerithium rhizoporarum* A. D. (Plate II, fig. 11), a shell about 5 centimeters in length. It is yellowish with dark lines. These shells almost invariably have the tip broken off, and the tail of the animal protruding. They are sold in the local market for about 5 centavos per kilogram.

STROMBUS SHELLS.

The *palagsi, Strombus canarium* Linn. (Plate II, fig. 15), is quite common in Manila Bay. It prefers shallow water and a sandy bottom. It is used as food, selling for 6 centavos per kilogram in the local markets. There are at least 30 species of this family (Strombdæ) found in the Philippines.

WHELK.

The *alaunghuga, Melongena cochlidium* Linn. (Plate I, fig. 7), is 8 to 10 centimeters in length, deep chestnut in color, and is very common in Manila Bay. The animal is used for food.

BLEEDING TOOTH SHELLS.

The family Neritidæ (Plate II, fig. 14) is represented by a great number of species which are very abundant in the Philippines. The local name is *sihi.* All are small shells usually much striped or highly colored. The children of the natives gather quantities of these animals for food. The species most frequently seen in the local market is *Neritina pennota* Benn. which is picked up from shallow water along almost any beach near Manila.

FRESH-WATER MOLLUSKS.

The *suso*, black river-snail (Plate II, fig. 16), and the *cohol*, green river-snail (Plate II, fig. 17), are apparently the only two fresh-water mollusks (except *Anodonta tenius*) sold in the local markets; however, these are quite abundant and sell for about 6 centavos per kilogram.

In addition to the shells named, there are other species of mollusks which are only occasionally found in the Manila market, but which are of considerable importance as food in other islands of the Archipelago, such as the various species of *Murex* (Muricidæ), tritons (Tritonidæ), spindle shells (Tuscidæ), volutes (Volutidæ), olives (Olividæ), cones (Conidæ), helmet shells (Cassididæ), turbin shells (Turbanidæ), top shells (Trochidæ), and abolons (Haliotidæ). A complete list of these species together with an account of their habits, abundance, times of breeding, methods of reproduction, and notes regarding the possibilities of their culture would be a most desirable and useful work.

ILLUSTRATIONS.

(From photographs by Charles Martin.)

PLATE I.—PHILIPPINE EDIBLE MOLLUSKS.

FIG. 1. *Talaban*, oyster (*Ostrea orientalis* Ch.).
2. *Halaan*, patayog, cabia, hard shell clam (*Tapes literata* Linn.).
3. *Halaan*, hard shell clam (*Tapes virginæ* Linn.).
4. *Calumismis*, surf clam (*Tapes striatus* Chem.).
5. *Saropsarop*, sand clam (*Circe undatina* Linn.)
6. *Lucan*, little-neck clam (*Cyrena suborbicularis* Phil.).
7. *Alaunghuga*, whelk (*Melongena cochlidium* Linn.).
8. *Sulib*, fresh-water mussel (*Anodonta tenius* Lea).
9. *Lutos*, duck-bill clam (*Anatina truncata* Linn.).
10. *Tehong*, mussel (*Modiola metcalfei* Hare.).
11. *Balay*, tongue clam (*Lingula anatina* Linn.).

PLATE II.—PHILIPPINE EDIBLE MOLLUSKS.

FIG. 1. *Tulla*, small green clam (*Psammobia togata* Slesh.).
2. *Camotpusa*, ridged sand clam (*Circe gibbea* Lk.).
3. *Bototoy*, rock clam (*Cardium dule* Linn.).
4. *Butil*, lesser ridged clam (*Cryptogramma squamosa* Linn.).
5. *Alamis*, minute sand clam (*Dorax radians* Lk.).
6. *Kanturi*, venus clam (*Cardium donaciforme* Speng).
7. *Morans*, waved venus clam (*Venus alta* Saw.).
8. *Paros* (*Capsella elongata* L.).
9. *Paros*, sunset shell (*Tellina incerta* Desh.).
10. *Tikhan*, razor clam (*Solen gracilis* Phil.).
11. *Susong-puti*, horn shell (*Cerithium rhizoporarum* A. D.).
12. *Bangongon*, horn shell (*Telescopium telescopium* Linn.).
13. *Suso*, horn shell (*Potomides sulcatus* Born.).
14. *Sihi*, bleeding tooth shell (*Neritina pennota* Bonn.).
15. *Palagsi*, strombus shell (*Strombus canarium* Linn.).
16. *Suso*, black river-snail (*Helicidæ*).
17. *Cohol*, green river-snail (*Helicidæ*).

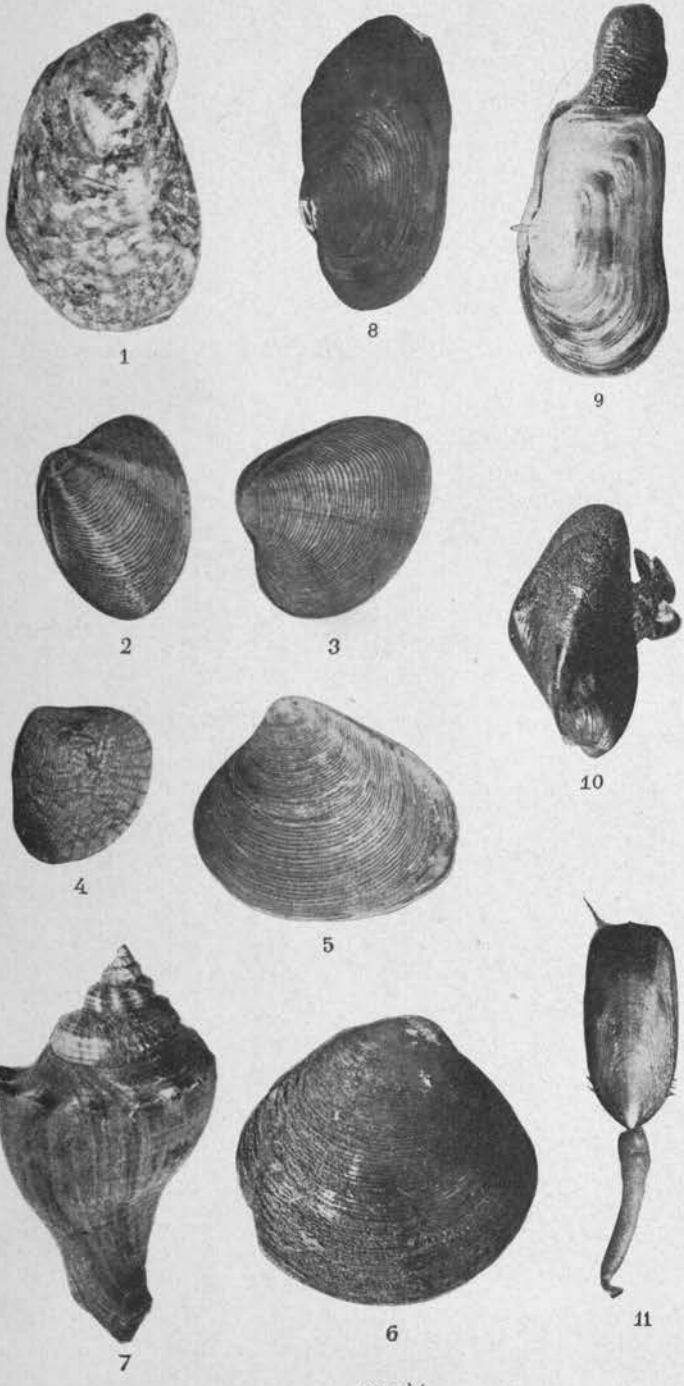


PLATE I. PHILIPPINE EDIBLE MOLLUSKS.

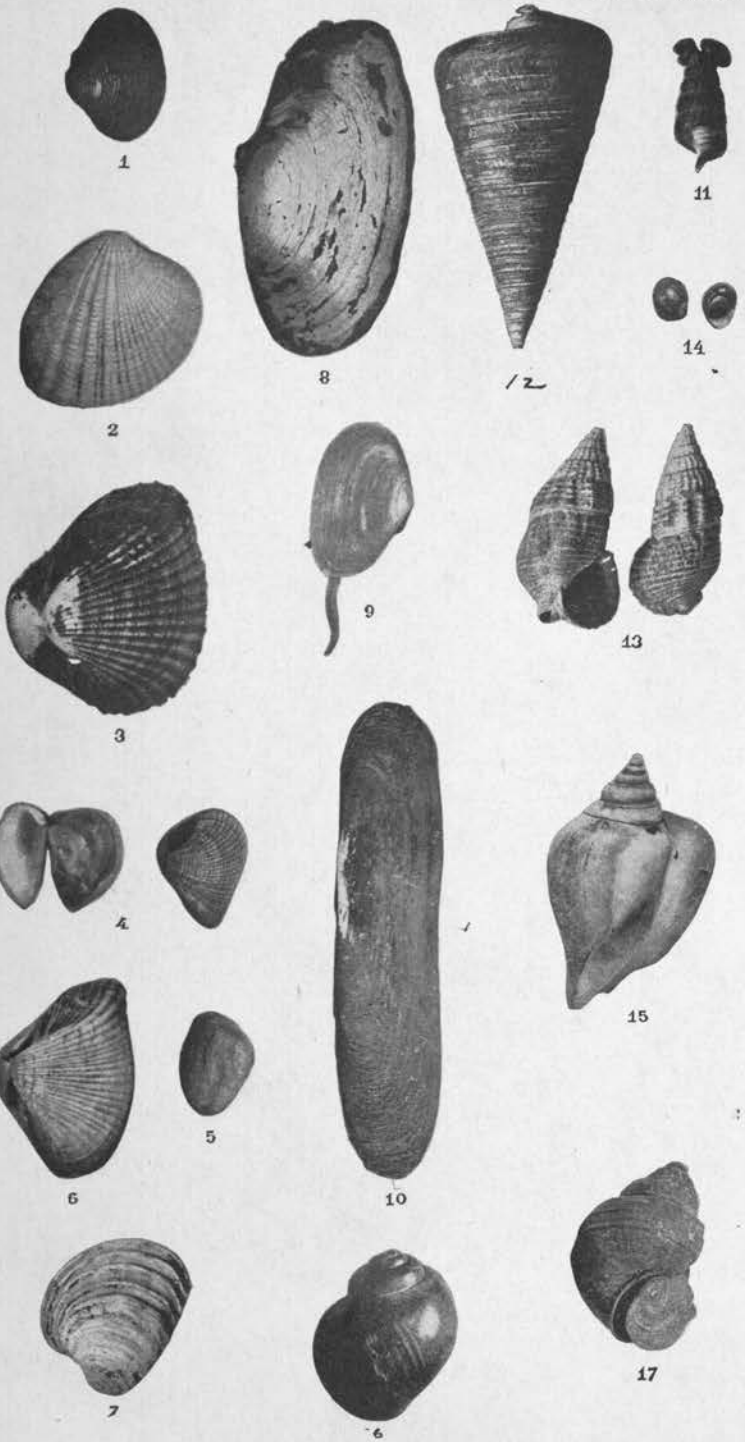


PLATE II. PHILIPPINE EDIBLE MOLLUSKS.

THE PHILIPPINE JOURNAL OF SCIENCE,
D. General Biology, Ethnology and Anthropology.
Vol. VII, No. 4, 1912.

DESCRIPTION OF A NEW ACANTHOCYBIUM FROM THE PHILIPPINE ISLANDS.

By ALVIN SEALE.

(From the Ichthyological Section, Biological Laboratory, Bureau of Science, Manila, P. I.)

Acanthocybium forbesi Seale sp. nov. Forbes' Kingfish. (Plate I.[1])

Head 4 in length without caudal; depth 7.3; eye 10 in head, 5 in snout; dorsal XXVI 1119, 9; anal II 10, 8. The lateral line has its origin considerably above the opercles and is strongly curved under the 14–17 dorsal spines. In the posterior portion of its course the line is wavey. Between the strong curve of the line and the caudal, it gives off numerous short vertical branches, 77 above and 80 below the main line. These branches consist of true mucous canals with pores and with 2 rows of thin scales on each side; they are of various lengths, unbranched, and lie in a vertical plane, the lower branches extending half the distance to the anal fin and the upper branches half the distance to the dorsal fin. The lateral line proper is accompanied on each side by a narrow series of long thin scales.

The eye is located directly above the base of the mandible. The lower jaw is pointed and slightly the longer. The maxillary is attached in such a manner as to admit of considerable movement of the upper jaw. Each jaw has a single row of rather large compressed teeth which are rounded at the top. The teeth are very small at the tip of the jaw, but increase in size, posteriorly, to 12 millimeters in length; vomer and palatine somewhat roughened, but without teeth; opercle rounded with a very inconspicuous point posteriorly; preopercle toothed;

[1] In our figure of this species the vertical branches of the lateral line are emphasized, and the true lateral line shows but three rows of scales whereas there should be six.

pectoral fins on median line of the body, their origin on a line with the origin of the ventrals and of the spinous dorsal, being midway between the tip of the snout and the base of the 20th dorsal spine; length of pectoral is 1.90 in head; ventral 4.10 in head; spinous dorsal long, and free from the soft dorsal, its anterior spine the longest, being 5 in head. The remaining spines are but slightly less in length until the 23rd spine is reached. The 24th to 26th are graduated. Longest ray of soft dorsal 4.5 in head; its origin midway between the origin of spinous dorsal and the end of the caudal vertebra. There are 9 free, distinct pinnules, with 1 additional pinnule attached by membrane to the soft dorsal. Origin of anal directly below the 7th ray of the soft dorsal; the length of anal rays equal to rays of dorsal. There are 8 free pinnules behind the anal fin with 1 additional pinnule attached to the fin. The origin of the anal is slightly nearer the end of the caudal vertebræ than to tip of ventrals. The caudal fin is falcate with the middle rays slightly projecting.

The caudal peduncle is strongly keeled, with the addition of 2 small oblique keels on base of caudal fin.

The head is naked; a narrow corslet of thin scales surrounds the anterior portion of the body and embraces the base of pectorals and of ventrals; a narrow line of scales along base of spinous dorsal; a rather wide area of long thin scales on the belly, extending back to the origin of the anal, this area being of greater width than the distance between the base of ventrals. These scales are very distinct, being about 8 millimeters in length by 1 millimeter in width.

Color in life, a beautiful steel-blue above, becoming lighter on sides and below; the dense scaled area of belly being fulvous; some beautiful dark blue vertical stripes on sides, which disappear within a few moments after the fish is taken from the water; the dorsal is dark blue; the caudal is bluish; the ventrals, pectorals, and anal are white, the tip of the anal being slightly shaded with gray; the head is colored similar to the body.

Type is No. 7253; length, 1.7 meters (64 inches); weight, 29.5 kilograms (65 pounds); caught off the coast of Leyte by Dean C. Worcester, August, 1911.

Named in honor of Governor-General W. Cameron Forbes in recognition of his interest in the development of the fisheries of the Philippine Islands.

Upon my first examination of this fish, I regarded it as being identical with the species called *Cubium sara* Benn., from the Loo Choo Islands, but after carefully looking up all the descrip-

tions and literature[2] relating to this species (now called *Cybium solanderi* Cuv. and Val.), I am convinced that this species is distinct.

The most striking features of *A. forbesi* are the peculiar, long thin scales on the belly and the branches of the lateral line, points of which I am sure the numerous careful naturalists who have examined *C. solanderi* (*C. sara*) would not have failed to mention in their descriptions. Also Jordan and Evermann described *A. solanderi* as having serrated teeth. The teeth of our specimen are apparently smooth. The above and several other points of differences, especially in the location of the fins, seem to make it necessary to describe our specimen as a distinct species.

[2] Bennett, in Beechey's Voyage Zool. (1849), 63, Pl. 20, fig. 2.
Cuvier and Valenciennes, Histoire Naturelle des Poissons (1831), 8, 141.
Gunther, Fische der Südsee (1876), 2, Taf. 94, Figs. A und B; Cat. Fishes Brit. Mus. (1860), 2, 373.
Doderlein, Grom de Sc. Nat. Ed. Ecom. (1872), 8.
Jordan and Evermann, Fishes of North .and Middle America (1896), Part I, 876, Bull. U. S. Fish Comm. (1903), Pl. 1, 176.

ILLUSTRATION.

PLATE I.

anthocybium forbesi Seale. Forbes' Kingfish. (Drawing by Espinosa.)

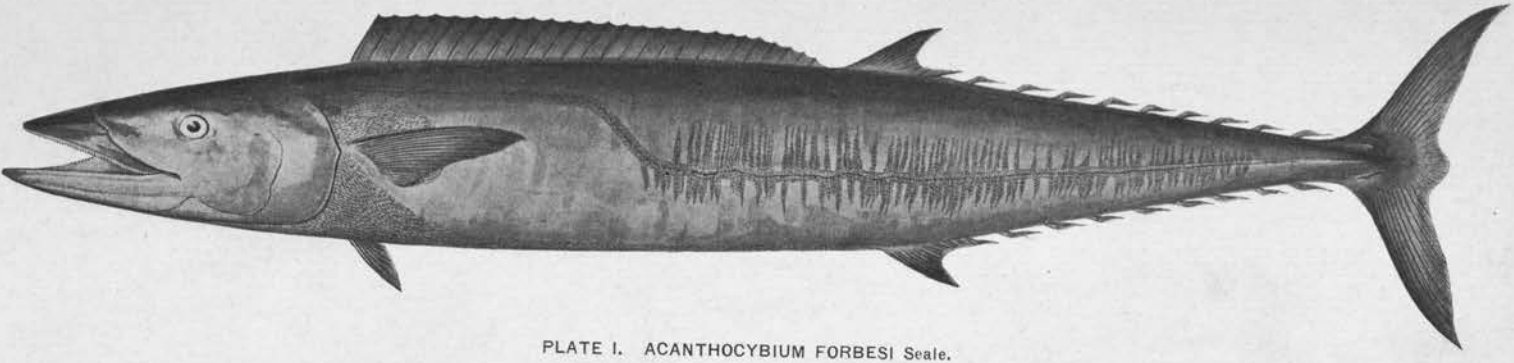


PLATE I. ACANTHOCYBIUM FORBESI Seale.

THE PHILIPPINE JOURNAL OF SCIENCE,
D. General Biology, Ethnology and Anthropology,
Vol. VII, No. 4, 1912.

EDITORIAL.

SOME POISONOUS PHILIPPINE FISHES.

The following letters serve to call our attention to the fact that death resulting from eating certain species of fish is of occasional occurrence in the Philippine Islands.

SIR: I have the honor to send you a bottle containing a small specimen of the poisonous fish known among the Moros as *tinga-tinga* and among the Filipinos as *botete*. This is the first specimen I have been able to get since the last case of poisoning which resulted in the death of a little girl and the narrow escape of several members of the family. The first effect after eating the fish is a dizziness and sickness at the stomach, but if the latter does not occur at once the victim, if he yields to his inclination and lies down and sleeps, will soon be aroused, vomit and soon expires. There have been so many fatalities among the Moros on account of eating the *tinga-tinga* that the people are careful. They say that if the head of the fish is cut off at once and the entrails removed the fish may be cooked and eaten.

In the case of the fatality to which reference is made, the woman who cooked the fish knew of its dangerous character, but thought she had taken all necessary precautions. The little girl, a visitor in the house, ate of the fish, was seized with the dizziness, and leaving the meal, lay down and slept a short time, when she was seized with an attack of vomiting and died in a few moments. All members of the family were seized with the well-known effects and vomited all night. These eventually recovered.

We have another poisonous fish in these waters and its use is as equally dangerous as the *tinga-tinga*. It is called in the Moro "loco."

(Signed.) SAMUEL D. CRAWFORD,
Governor of Basilan.

SIR: I have the honor to inform you that at the sitio of Kamayá in this municipality, several cases of poisoning caused by a fish commonly known as "*botete*" have occurred, the victims being Roque Noruega, Lorenzo Noruega, Genoveva Noruega, Ciriaco Noruega, Petra Sales, Fernando Noruega, Matias Noruega, Proceso Useñas, Antonio Tamora, Amada Useñas, Pomposa Useñas, Carmen Useñas, and Francisco Villarin. These persons, without any thought of evil, ate of the fish mentioned yesterday

afternoon between 5 and 6 o'clock, and from the effects thereof the youth Fernando Noruega died last night between 11 and 12, and the boy Matias Noruega this afternoon between 2 and 3 o'clock. Petra Sales is in a very serious condition.

All survivors have been given the necessary aid and treatment by the physician in charge of the quarantine station.

(Signed.) VALENTIN SEMILLA,
Municipal President.

DECEMBER 11, 1911.

The fish called *tinga-tinga* or *botete* in the above communications is the black-spotted puffer, *Spheroides sceleratus* (Forster) (Fig. 1). It belongs to the family Tetraodontidæ. There are 14 species of this family found in the Philippines; all of them

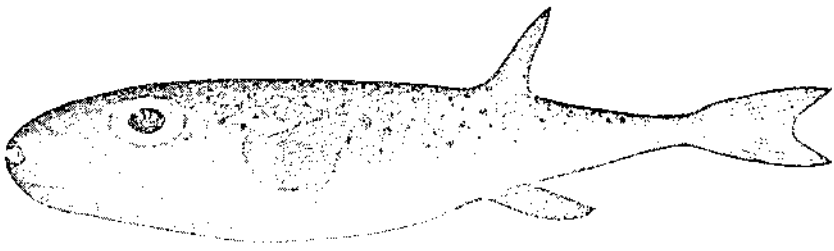


FIG. 1. "Tinga-tinga" or "botete."

are supposed to secrete a specific poisonous alkaloid which gives rise to gastric trouble of a very serious nature when taken into the stomach of man.

These fishes are common all over the tropical Pacific; they are usually found in shallow water, and under ordinary conditions are sluggish in their movements. When one is captured, it distends its stomach until it resembles a ball. Their color is usually white below, with black dots, stripes, or bands on the sides and back. In length they range from 2 to 20 centimeters.

The fish called "loco" in the first letter belongs to the family Diodontidæ, or porcupine fish, called *botiting laot* in Tagalog. There are 3 species of this family found in Philippine waters, all believed to be poisonous.

In addition to the above, there are 7 species of Balistidæ, or trigger fishes, called *papaco*, and 10 species of Monacanthidæ, or file fishes, called *pacol*, which should be regarded with grave suspicion.

There is very little danger of an American or European eating any of these fishes, as their appearance and smell are offensive, and they are too small to be desirable for the table.

Nearly all the natives of the Islands know that these fishes are poisonous, but either because of the peculiar flavor, or because of the ease with which they are caught, the fish are often eaten, and usually with deplorable results.

The treatment of a person who has eaten poisonous fish is promptly to empty the stomach of the patient with an emetic, such as tepid salt water or mustard. Then a stimulant such as whisky or *vino* should be given. In case of collapse, artificial breathing should be employed.

ALVIN SEALE.

ILLUSTRATION.

TEXT FIGURE.

FIG. 1. *Tinga-tinga* or *botete*, *Spheroides sceleratus* (Forster). (Drawing by Espinosa.)

112401——6

PUBLICATIONS FOR SALE BY THE BUREAU OF SCIENCE, MANILA, PHILIPPINE ISLANDS

A LIST OF THE MAMMALS OF THE PHILIPPINE ISLANDS, EXCLUSIVE OF THE CETACEA.

By NED HOLLISTER.

Order No. 418. Paper, $0.50 United States currency, postpaid.

This is the only recent attempt to enumerate the mammals of the Philippine Islands. The distribution of each species is given and the original descriptions are cited.

PRICE-LIST OF PHOTOGRAPHS.

For sale by the Bureau of Science.

Order No. 417. For free distribution.

This is a list of selected photographs from the splendidly complete collection of the Bureau of Science.

A MANUAL OF PHILIPPINE BIRDS.

By RICHARD C. MCGREGOR.

2 parts, 769 pages.

Order No. 103. Paper, $4 United States currency, postpaid.

Mr. McGregor spent some eight years in active field work, visiting many parts of the Archipelago, before beginning work on this book. Therefore, he was well prepared to undertake the preparation of the manual.

A Manual of Philippine Birds contains in compact form descriptions of all the known species of Philippine birds. The usual keys and diagnoses of orders, families, and genera help the novice in identification.

Under each species are found native, English, and scientific names, distribution by islands, descriptions of the birds and in many instances notes on nesting, migrations, and other habits.

A CHECK-LIST OF PHILIPPINE FISHES.

By DAVID STARR JORDAN and ROBERT EARLE RICHARDSON.

78 pages.

Order No. 102. Paper, $0.75 United States currency, postpaid.

This list will be found a convenient guide to the synonymy of Philippine ichthyology. The nomenclature is thoroughly revised and the distribution of each species within the Philippine Islands is given.

This check-list is uniform in size and style with McGregor and Worcester's Hand-list of Philippine Birds.

INDO-MALAYAN WOODS.

By FRED W. FOXWORTHY.

182 pages, 9 photographic plates.

Order No. 411. Paper, $0.50 United States currency, postpaid.

In Indo-Malayan Woods, Doctor Foxworthy has brought together a large amount of accurate information concerning trees yielding woods of economic value. The work is based largely upon the author's own experience in the Philippine and neighboring regions, but previous publications and information generously given by other dendrologists have been used to correlate commercial and native names of useful Indo-Malayan trees.

PHILIPPINE HATS.

By C. B. ROBINSON.

Order No. 415. Paper, $0.50 United States currency, postpaid.

This paper is a concise record of the history and present condition of hat making in the Philippine Islands. The various materials used and the different kinds of hats made in each center of production are fully described. Not of the least importance are the botanical identifications of the plants from which the hat materials are obtained.

The plates illustrate the hat materials and various kinds and grades of hats. A map of central Luzon shows the towns chiefly concerned in this industry.

THE COCONUT PALM IN THE PHILIPPINE ISLANDS.

149 pages, 30 plates.

Order No. 37. Paper, $1 United States currency, postpaid.

The reprint contains the following articles: On the Water Relations of the Coconut Palm (Cocos nucifera), by Edwin Bingham Copeland; The Coconut and its Relation to Coconut Oil, and The Keeping Qualities of Coconut Oil and the Causes of its Rancidity, by Herbert S. Walker; The Principal Insects Attacking the Coconut Palm (Parts I and II), by Charles S. Banks; with an introduction by Paul C. Freer.

A VOCABULARY OF THE IGOROT LANGUAGE AS SPOKEN BY THE BONTOK IGOROTS.

By WALTER CLAYTON CLAPP.

89 pages.

Order No. 408. Paper, $0.75 United States currency, postpaid.

The introduction to this vocabulary contains notes on pronunciation, vowels, diphthongs, consonants, verbs, conjugations, syllabication and reduplication. The vocabulary is given in Igorot-English and English-Igorot.

THE NABALOI DIALECT.

By OTTO SCHEERER.

65 pages, 29 plates.

AND

THE BATAKS OF PALAWAN.

By EDWARD Y. MILLER.

7 pages, 6 plates.

Order No. 403. Paper, $0.25; half morocco, $0.75 United States currency, postpaid.

The Nabaloi Dialect and the Bataks of Palawan are bound under one cover.

THE BATAN DIALECT AS A MEMBER OF THE PHILIPPINE GROUP OF LANGUAGES.

By OTTO SCHEERER.

AND

"F" AND "V" IN PHILIPPINE LANGUAGES.

By CARLOS EVERETT CONANT.

These two papers are issued under one cover, 141 pages.

Order No. 407. Paper, $0.80 United States currency, postpaid.

Orders for these publications may be sent to the Business Manager, Philippine Journal of Science, Bureau of Science, Manila, P. I., or to any of the agents listed below. Please give order number.

The Macmillan Company, 64–66 Fifth Avenue, New York City, U. S. A.
Wm. Wesley & Son, 28 Essex Street, Strand, London, W. C., England.
Martinus Nijhoff, Noordeinstraat 18, The Hague, Holland.
Mayer & Müller, Prinz Louis Ferdinandstrasse 2, Berlin, N.W., Germany.
Kelley & Walsh, Limited, 32 Raffles Place, Singapore, Straits Settlements.
A. M. & J. Ferguson, 19 Baillie Street, Colombo, Ceylon.
Thacker, Spink & Co., P. O. Box 54, Calcutta, India.

PUBLICATIONS FOR SALE BY THE BUREAU OF SCIENCE, MANILA, PHILIPPINE ISLANDS

THE SUBANUNS OF SINDANGAN BAY.

By EMERSON B. CHRISTIE.

121 pages, 1 map, 29 plates.

Order No. 410. Paper, $1.25 United States currency, postpaid.

Sindangan Bay is situated on the northern coast of Zamboanga Peninsula. The Subanuns of this region were studied by Mr. Christie during two periods of five and six weeks, respectively.

The following is an abstract from the contents of Mr. Christie's report on the Subanuns: Habitat and history; relations with the Moros; material culture; houses; industries; trade; agriculture; family life; social customs; administration of justice; religion; the medicine man; ceremonies; tales; word-lists; physical measurements.

The 29 plates illustrate the Subanuns at work and at play; their industries, houses, altars, and implements; and the people themselves.

THE HISTORY OF SULU.

By NAJEEB M. SALEEBY.

275 pages, 4 maps, 2 diagrams.

Order No. 406. Paper, $0.75 United States currency, postpaid.

In the preparation of his manuscript for The History of Sulu Doctor Saleeby spent much time and effort in gaining access to documents in the possession of the Sultan of Sulu. It is fortunate that these records have now been translated and preserved in permanent form. This book is a history of the Moros in the Philippines from the earliest times to the American occupation.

STUDIES IN MORO HISTORY, LAW, AND RELIGION.

By NAJEEB M. SALEEBY.

107 pages, 16 plates, 5 diagrams.

Order No. 405. Paper, $0.25; half morocco, $0.75 United States currency, postpaid.

This volume deals with the earliest written records of the Moros in Mindanao. Doctor Saleeby was fortunately able to obtain exact copies of carefully preserved early records written in the Magindanao dialect with Arabic characters. The author presents translations of these as well as 16 half-tone illustrations of certain pages from the originals. The names of the rulers of Magindanao are recorded in five folding diagrams.

NEGRITOS OF ZAMBALES.

By WILLIAM ALLAN REED.

83 pages, 62 plates.

Order No. 402. Paper, $0.25; half morocco, $0.75 United States currency, postpaid.

The introductory chapter deals with the general distribution of Negritos and with the distribution of the Philippine branch of the race. The succeeding chapters deal with the various industries, amusements, and social relations of these little men.

Plates from photographs, the greater part of which was taken for this publication, show ornaments, houses, men making fire with bamboo, bows and arrows, dances, and various types of the people themselves.

CONTENTS.

	Page.
CHRISTIE, EMERSON BREWER. The Stone Industry at San Esteban, Ilokos Sur	213
CHRISTIE, EMERSON BREWER. Notes on the Wood-Working Industry of San Vicente, Ilokos Sur	231
OSHIMA, MASAMITSU. Description of a New Gecko from Botel Tobago Island	241
BERNHAUER, MAX. Neue Staphyliniden der Philippinen	245
OHAUS, FR. Nachträge und Berichtigungen zu: „Die Ruteliden der Philippinischen Inseln"	255
SEALE, ALVIN. Notes on Philippine Edible Mollusks	273
SEALE, ALVIN. Description of a New Acanthocybium from the Philippine Islands	283
EDITORIAL	289

The "Philippine Journal of Science" is issued as follows:	U. S. currency.
Section A. Chemical and Geological Sciences and the Industries	$2.00
Section B. The Philippine Journal of Tropical Medicine	3.00
Section C. Botany	2.00
Section D. General Biology, Ethnology and Anthropology (Section D began with Volume V)	2.00
Entire Journal, Volume II, III, IV, or V	5.00
Entire Journal, beginning with Volume VI	7.00
Single numbers	.50
Volume I, 1906 (not divided into sections)	10.00
Supplement to Volume I (botany)	3.50
Volume I (without supplement)	6.50

Each section is separately paged and indexed.

Publications sent in exchange for the Philippine Journal of Science should be addressed: Library, Bureau of Science, Manila, P. I.

Subscriptions may be sent to the BUSINESS MANAGER, Philippine Journal of Science, Bureau of Science, Manila, P. I., or to any of the agents listed below:

AGENTS.

The Macmillan Company, 64–66 Fifth Avenue, New York City, U. S. A.
Wm. Wesley & Son, 28 Essex Street, Strand, London, W. C., England.
Martinus Nijhoff, Noordeinde 18, The Hague, Holland.
Mayer & Müller, Prinz Louis Ferdinandstrasse 2, Berlin, N.W., Germany.
Kelley & Walsh, Limited, 32 Raffles Place, Singapore, Straits Settlements.
A. M. & J. Ferguson, 19 Baillie Street, Colombo, Ceylon.
Thacker, Spink & Co., P. O. Box 54, Calcutta, India.

Entered at the post-office at Manila, P. I., as second-class matter.